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TRANSACTIONS AND PROCEEDINGS

AND

REPORT

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XII.

For 1888-89.

EDITED BY PROF. R. TATE, F.G.S., F.L.S.

[With Five Plates.]

PRICE FIVE SHILLINGS.

Adelaide:
W. C. RIGBY, 74, KING WILLIAM STREET.

DECEMBER, 1889.

Parcels for transmission to the Royal Society of South Australia, from Europe and America should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 35, Milk Street, Cheapside, London."

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The Foraminifera of the Older Tertiary of Australia (No. 1, Muddy Creek, Victoria).

By Walter Howchin, F.G.S.

[Read October 4, 1888.]

Plate I.

The Older Tertiary beds exposed on Muddy Creek consist of two main divisions, sharply distinguished in their palæontological as well as their stratigraphical features.* In the following list those species which only occur in the Lower Bed are indicated by an asterisk (*). Those peculiar to the Upper Bed are marked with a dagger (†).

FAMILY MILIOLIDÆ.

Genus—Biloculina, *d'Orbigny.*

1. *B. ringens*, Lamk. Not common in Lower Bed, but include some very large examples. Upper Bed, rather scarce.

2. *B. depressa*, d'Orb. Most of the specimens possess flaps at the aboral extremity, as shown by Mr. Brady in "Challenger" Report, but those from Muddy Creek have these appendages much larger than the one figured by Mr. Brady. Lower Bed, rather scarce, as also in Upper Bed.

3. **B. irregularis*, d'Orb. These exhibit great diversity of form, some being much depressed laterally, whilst others in their subglobular outline approach very near to *B. sphaera*. The aperture is generally a curved gaping slit without tongue. Lower Bed, rather scarce.

4. *B. elongata*, d'Orb. Lower Bed and Upper Bed, rare.

5. †*B. bulloides*, d'Orb. The examples of this species are few in number, but of large size, and are distinguished by very large stelate apertures. Mr. Brady ("Challenger" Report) has shown that *B. sphaera*, d'Orb., sometimes possesses a labyrinthic aperture, especially in the case of deep water examples. In the present instance the aperture is not labyrinthic, but exhibits strong bars of shell substance radiating from the centre to the outer margin of the oral aperture. Upper Bed, rare.

6. †*B. sp.* A large species of *Biloculina*, possessing thick longitudinal costæ which are rendered still more conspicuous by a slight weathering of the test, was obtained from the Upper Bed;

* Dennant, Roy. Soc. S. Aust., vol. xi., p. 30, et seq.; Tate, Roy. Soc., N.S.W., 1888, p. 242.

but the specimens, which were few in number, have been unfortunately mislaid.

Genus—MILIOLINA, *Williamson.*

7. *M. seminulum*, Linn. Of the short and thick variety, mostly fine examples, measuring up to one-tenth of an inch. Lower Bed, moderately common. Upper Bed, very common.

8. **M. Cuvieriana*, d'Orb. Lower Bed, rather scarce.

9. *M. trigonula*, Lamk. In Lower and Upper Beds, rather scarce.

10. *M. tricarinata*, d'Orb. Lower Bed, rather scarce. Upper Bed, rare.

11. **M. valvularis*, Rss. A single example of robust build has, with some hesitation, been referred to this species. Lower Bed.

12. **M. prisca*, Terq. One of the pitted *Miliolidæ*. In weathered specimens the pitted depressions become coarse perforations of the test. Lower Bed, moderately common.

13. *M. oblonga*, Montag. Not very characteristic, the specimens being mainly passage forms approaching the elongated varieties of *M. seminulum*. Lower Bed, moderately common. Upper Bed, common.

14. **M. pygmæa*, Rss. Lower Bed, moderately common.

15. *M. Linneana*, d'Orb. Several examples of this fine species were observed in both formations, but it is not very common.

16. **M. Brongniartii*, d'Orb. Lower Bed, rare.

17. **M. Ferussacii*, d'Orb. Lower Bed, moderately common.

18. **M. undosa*, Kar. Many of the specimens show intermediate characters approaching *M. Ferussacii*. Lower Bed, common. The most characteristic examples of this species in the Challenger collection were from Bass Straits.

19. **M. scrobiculata*, Brady. One or two specimens were obtained in Lower Bed which agree very closely with Mr. Brady's descriptions and figures. This form must be distinguished from *Articulina sulcata*, which it somewhat resembles.

20. *M. agglutinans*, d'Orb. Specimens vary from a broad oval outline to a much elongated test with produced neck. Lower Bed, very common. In Upper Bed the examples are fewer in number, and for the most part very coarse in test structure.

21. **M. angularis*, sp. nov. Pl. i., figs. 1—3.

Test free, elongate, fusiform; composed of numerous (about 18 or 20) chambers, arranged lengthways, and more or less spirally around the longer axis. Segments narrow and much compressed, investing, only the final whorl being visible externally. Early chambers oval in transverse section; the later chambers increase in size mainly in a lateral direction. The final whorl consists of from five to six chambers arranged at obtuse angles to each other,

70 102 AA A 30

and exhibit in peripheral outline as many facets and angles as there are segments in outer whorl. External surface smooth. Aperture small, terminal, obscure. Length, $\frac{1}{18}$ in.

The species now described is distinguished from its congeners by the great number of its chambers, their shallowness in comparison with their length, and the completeness of their investing character. Its nearest analogue in the Milioline series appears to be *M. alveoliniformis*, Br. The latter species can be easily distinguished by its arenaceous test, tubular chambers, and deeply depressed sutures, whilst *M. angularis* is always porcellaneous in its testaceous investment, the chambers are compressed transversely to little more than narrow slits, and the sutures are flush or marked by prominent angles in peripheral outline. Lower Bed, moderately common.

22. †*M. secans*, d'Orb. Upper Bed, rather scarce.
23. †*M. bicornis*, W. and J. Upper Bed, very rare.
24. †*M. insignis*, Brady. Upper Bed, very rare.

Genus—SPIROLOCULINA, *d'Orbigny*.

25. **S. asperula*, Kar. Rather coarsely arenaceous, with a thin outspread test. In the Muddy Creek specimens none but the marginal segments are distinctly visible on the exterior. Lower Bed, rare.
26. *S. grata*, Terq. Lower Bed, rather scarce. Upper Bed, very rare.
27. **S. affixa*, Terq. Lower Bed, rather scarce.
28. †*S. limbata*, d'Orb. Upper Bed, rather scarce.
29. **S. Tateana*, sp. nov. Pl. i., figs. 4, 5.

Test oblong or nearly circular, much compressed; primordial region biconvex and fusiform, consisting of numerous elongated segments arranged in an acervuline manner. Later chambers (varying from three to six on either side) flattened, outspread, and arranged concentrically. Segments narrow, smooth, nearly flush, much attenuated near the raised centre, increasing gradually in diameter towards the outer margin. Periphery rounded. Average size, $\frac{1}{10}$ in. diameter.

This shell is constructed on a double plan of growth, the earlier portions being Milioline, or investing, and the latter segments outspread or Spiroloculine. The acervuline chambers often exhibit a close resemblance to small examples of *Miliolina pygmæa*, and when the outspread portion of the test is reduced to a single segment on either side, as is the case with some specimens, the analogy is very close. The outer chambers form a fringe around the thickened centre very much like the alæ of certain seeds. It is a small and delicate shell, the outspread portion being sufficiently translucent to show by transmitted light

the septation with great distinctness. Mr. Brady, to whom specimens were submitted, informs me that he has occasionally met with examples similar to the present in recent material associated with *S. crenata*, Kar., and at the time regarded it as a weak thin-shelled modification of that species. *S. crenata* does not occur in the Muddy Creek material, but the form now described is comparatively common, and in no instance have I seen the slightest tendency to crenulation of the test as in *S. crenata*. There is therefore no alternative but to assign it a specific position. I have great pleasure in associating the name of my friend Prof. Ralph Tate, F.G.S., with this shell, as one who has devoted much time and conspicuous ability in working out the mollusca of the beds from which the species now described has been obtained. Lower Bed, moderately common.

Genus—CORNUSPIRA, *Schultze.*

30. **C. involvens*, Rss. The larger examples exhibit an ornamentation of fine wavy disconnected striæ, running in a line with the convolutions. Lower Bed, rather scarce.

31. **C. foliacea*, Phil. It is worthy of note that all the specimens, which are more or less weathered, show a fine surface ornamentation resembling *C. striolata*, Brady; but they undoubtedly belong to the above species, and the ornamentation seems to have been brought out as an effect of weathering. Lower Bed, rather scarce.

32. **C. crassisepta*, Brady. Lower Bed, rare.

Genus—HAUERINA, *d'Orbigny.*

33. †*H. intermedia*, spec. nov. Pl. i., fig. 6.

Test free, compressed, consisting of two or three convolutions, which increase in size towards the oral extremity. Segments compressed laterally, arcuate, inflated, from six to ten visible externally and from three to five in final convolution; segmentation marked externally by lines of sutural constrictions. Surface of test, smooth; colour an opaque-white. Peripheral margin carinate, sub-carinate, or rounded. Aperture never compound, but Milioline in character, formed by a slight constriction of the chamber cavity, and furnished with a long straight tooth rising from the inferior portion of the peripheral margin of the final chamber, and extends to about half the diameter of the aperture in a line with the medial plane. Adult specimens, $\frac{1}{20}$ in.

The most striking feature of the form now described is the divergence which it exhibits from the generic type in relation to the aperture. *Hauerina*, as a rule, carries a very distinctive cribiform or compound orifice, whilst the present species is conspicuously and (so far as my observation has gone) invariably

Milioline in its oral features. This variation establishes another point of resemblance between *Haueriua* and *Miliolina*, in addition to that which is exhibited by the Milioline arrangement of its earlier segments. Upper Bed, moderately common.

Genus—VERTEBRALINA, *d'Orbigny.*

34. *V. insignis*, Brady. A feeble variety of this rare form occurs in the material, the triangular and carinate periphery, the ornamentation in regular parallel lines, and the absence of rectilineal growth are sufficient to mark the species. This is the first record of it in a fossil state, and it is only known as an existing species from three localities, one of which is Torres Straits. Lower and Upper Beds, rare.

Genus—ARTICULINA, *d'Orbigny.*

35. **A. sulcata*, Rss. Reuss figures a minute and somewhat dubious form under this name from the Tertiaries of Germany. It is known as a recent shell from four "Challenger" stations, one being off Raine Island, Torres Straits. Lower Bed, rare.

36. **A. sagra*, d'Orb. A complete example and the final segment of another were the only indications of this species observed. Lower Bed.

Genus—ORBITOLITES, *Lamarck.*

37. **O. complanata*, Lamk. Several fragments of fairly large shells were noted, but in each case these were broken and worn by attrition. They are most likely to be derived fossils not proper to the bed. Lower Bed.

Genus—PLANISPIRINA, *Sequenza.*

38. *P. sigmoidea*, Brady. This is one of the "Challenger" species, but only noted at five stations. Lower Bed, moderately common. Upper Bed, rare.

39. **P. exigua*, Brady. Two specimens occurred of this minute but interesting little shell. Like the preceding, this is the first record of its occurrence in the fossil condition. Lower Bed, rare.

FAMILY LITUOLIDÆ.

Genus—LITUOLA, *Lamarck.*

40. †*L. nautiloidea*, Lamk. A single example, showing labyrinthic structure, from Upper Bed.

Genus—PLACOPSILINA, *d'Orbigny.*

41. †*P. Cenomana*, d'Orb. Single specimen from Upper Bed.

Genus—REOPHAX, *de Montfort.*

42. **R. fusiformis*, Will. The examples of *Reophax* from Muddy Creek are remarkable for the very coarse structure of their tests, being built up of the exuviæ of *M. pygmæa*, *Discorbinæ*, and other foraminiferal shells, and shelly sand. A few single-chambered specimens have been referred to this species, but they are not common. Lower Bed.

43. **R. scorpiurus*, Montfort. One or two tapering and segmented examples may be referred to this species, but it is rarer than the preceding. Lower Bed.

Genus—HAPLOPHRAGMIUM, *Reuss.*

44. **H. pseudospirale*, Will. Several relatively large examples, coarsely built, compressed, obscurely segmented, one with subspiral commencement. Lower Bed, rather scarce.

45. **H. agglutinans*, d'Orb. A single specimen has been referred to this species, although it is far from characteristic, being subglobular and without rectilinear segments, but this seems the best classification that can be made at present. Lower Bed.

46. **H. sphæroidiniformis*, Br. *MS.* Mr. Brady has favoured me with the following notes on this, at present, undescribed species:—"I have this in my cabinet (from Mr. Robertson, I think). I believe it to be the Sphæroidine isomorph in the *Haplophragmium* series, just as *H. globigeriniformis* is the Globigerine form of the genus. I have given it the *MSS.* name of *Haplophragmium sphæroidiniformis*. The aperture resembles *Sphæroidina* more than *Textularia*, and some specimens which I have seen are very like *Sphæroidina*—indeed, in all but texture." Lower Bed, common.

Genus—BDELLOIDINA, *Carter.*

47 **D. aggreyata*, Carter. Three examples of this very rare species were met with. Mr. Brady ("Challenger" Report) states that the known distribution of the species was limited to the north coast of New Guinea for recent specimens, and a single Cretaceous specimen in the fossil condition. The forms from Muddy Creek are detached, and show clearly on the underside the peculiar labyrinthic structure of the test. Lower Bed, rare.

Genus—TEXTULARIA, *Defrance.*

48. **T. aspera*, Brady. Very fine examples, and in considerable numbers. Lower Bed.

49. **T. gibbosa*, d'Orb. Moderately common, Lower Bed.

50. **T. agglutinans*, d'Orb. Typical specimens of this species are rare in the material, and at best can only be reckoned as passage forms with allied species. Lower Bed.

51. *T. agglutinans*, var. *porrecta*, Brady. Differs from the type

mainly by the chambers being less inflated, the septal lines more nearly flush, the shell elongated, and has a neater and more symmetrical form than *T. agglutinans*. It is in the main a coral-reef form in the recent condition. Lower and Upper Beds, rather scarce.

52. **T. rugosa*, Rss. This is also a characteristic coral-reef species. Lower Bed, rare.

53. *T. sagittula*, Def. One of the commonest forms in this very rich material, many of the specimens attaining a large size. Lower and Upper Beds.

54. **T. sagittula* var. *fistulosa*, Br. A few examples of this variety with fistulose growths on the lateral edges occur, but they are relatively rare. Lower Bed.

55 **T. carinata*, d'Orb. This is a somewhat variable species. A single specimen was noted, which I think must be referred to it, although the septal lines are non-limbate and slightly depressed. The lateral margins are sharply carinate, and give indications of having possessed dentate appendages, although most of these are broken, probably from attrition. Lower Bed.

56. **T. gramen*, d'Orb. A species of the *T. sagittula* type, but much broader in relation to its length, and with greater inflation of the later segments. Lower Bed, rather scarce.

Genus—Pavonina, *d'Orbigny*.

57. **P. flabelliformis*, d'Orb. The only species of the genus founded by d'Orbigny as far back as 1826, and unverified by subsequent researches until recent years. Mr. Brady records it from nine or ten localities, one of which is Torres Straits. It is a compressed, fan-shaped, dimorphous foraminifer; textularian in its earlier segments, the later segments being arranged in single series. This is the first record of its occurrence in a fossil condition. Lower Bed, very rare.

Genus—Verneuilina, *d'Orbigny*.

58. *V. triquetra*, Münst. The specimens show a considerable range as to size and contour, but are always distinctly triangular in shape, with rough exterior. Lower Bed, common. Upper Bed, rare.

59. **V. tricarinata*, d'Orb. More regular in shape than the preceding, and less rugose. Lower Bed, rare.

60. **V. polystropha*. Lower Bed, rare.

61. **V.* sp. A form closely allied to *V. spinulosa*, Reuss, from which it differs chiefly in its more elongated contour, absence of spines, and nearly flush septation. Specimens were submitted to Mr. Brady, who writes that he is "convinced it has been figured,'

although at the time he could not find the description. Lower Bed, rather scarce.

62 †*V. pygmaea*, Egger. Upper Bed, very rare.

Genus—GAUDRYINA, *d'Orbigny.*

63. **G. rugosa*, d'Orb. Closely resembles *V. triquetra*, from which it differs only in the biserial arrangement of its later chambers. Lower Bed, rather scarce.

Genus—CLAVULINA, *d'Orbigny.*

64. *C. communis*, d'Orb. Lower and Upper Beds, very rare.

65. *C. angularis*, d'Orb. Lower and Upper Beds, very rare.

Genus—BULIMINA, *d'Orbigny.*

66. *B. elegantissima*, d'Orb. A single example was obtained of this beautiful little shell from each of the beds of the Muddy Creek section.

67. **B. obtusa*, d'Orb. A sub-cylindrical variety with obtuse aboral extremity. Occurs as a Cretaceous form in European strata. Lower Bed, very rare.

Genus—BOLIVINA, *d'Orbigny.*

68. **B. punctata*, d'Orb. Lower Bed, rather scarce.

69. **B. limbata*, Br. In the recent condition this is a common form on the New Guinea coasts and the Australian coral-reef. Lower Bed, rare.

70. **B. dilatata*, Rss. Two specimens, which are not altogether characteristic, have been assigned to this species. They are apparently intermediate forms uniting *B. dilatata* with *B. pygmaea*, Br. Lower Bed.

Genus—CASSIDULINA, *d'Orbigny.*

71. *C. subglobosa*, Br. In the recent condition it has a deep water habitat. Common in Lower Bed, but of small size. Upper Bed, very rare.

72. **C. lævigata*, d'Orb. Lower Bed, rare.

Genus—EHRENBERGINA, *Reuss.*

73. **E. serrata*, Rss. Lower Bed, rather scarce.

FAMILY LAGENIDÆ.

Genus—LAGENA, *Walker & Jacob.*

74. **L. hexagona*, Will. A single specimen. Lower Bed.

75. *L. sulcata*, W. & J. Lower Bed, rare. Upper Bed, very rare.

76. **L. globosa*, Montag. Lower Bed, rare.

77. **L. lineata*, Will. A single specimen. Lower Bed.
78. **L. marginata*, W. & B. Lower Bed, rare.
79. †*L. melo*, d'Orb. Upper Bed, very rare.

Genus—NODOSARIA, *Lamarck*.

The representatives of this genus in the material, although not common as to individuals, represent a relatively large number of species, and include some specimens of unusual size. In classification I have followed Mr. Brady's method of including the Dentaline and Glanduline varieties under the present heading.

80. **N. soluta*, Rss. Fine typical specimens. Lower Bed, rare.
81. *N. paupérata*, d'Orb. One example (faintly striated) is one-sixth of an inch in length. Lower and Upper Beds, rare.
82. **N. scalaris*, Batsch. The specimens are mostly limited to two or three chambers. Lower Bed, rather scarce.
83. **N. multilineata*, Borne. A few fine examples occur. Lower Bed.
84. **N. obliqua*, Linné. Lower Bed, rare.
85. **N. plebeia*, Rss. A single specimen. Lower Bed.
86. **N. costulata*, Rss. A single example, consisting of three inflated chambers, apiculate, and with strongly developed costæ bridging the sutural depressions. Lower Bed.
87. **N. affinis*, d'Orb. One large example of this species measures five-sixteenths of an inch in length. It consists of seven segments, with a constriction near the middle of the test, which gives it the appearance of being nearly nipped in two. Lower Bed, rare.
88. *N. raphanus*, Linné. Not common. One example measures a quarter of an inch in length. Lower and Upper Beds.
89. †*N. consobrina*, d'Orb. Upper Bed, very rare.
90. †*N. (G.) æqualis*, Rss. Upper Bed, rare.
91. *N. (G.) lævigata*, d'Orb. Lower Bed, rare. Upper Bed, very rare.

Genus—LINGULINA, *d'Orbigny*.

92. **L. carinata*, var. *seminuda*, Batsch. A single very fine example, consisting apparently of only two segments. Lower Bed.

Genus—MARGINULINA, *d'Orbigny*.

93. **M. costata*, Batsch. Lower Bed, rather scarce.

Genus—FRONDICULARIA, *Defrance*.

94. *F. complanata*, Def. Lower Bed, rare. Upper Bed, very rare.

Genus—VAGINULINA, *d'Orbigny*.

95. **V. linearis*, Montag. Lower Bed, very rare.

Genus—RHABDOGONIUM, *Reuss.*

96. †*R. sp.* Two shells, one a remarkably fine example of a *Rhabdogonium* with symmetrical outline and strongly developed tricarinate test, were obtained from the Upper Bed. I have little doubt that they represent an undescribed species, but the specimens have been unfortunately mislaid, and therefore cannot be determined at present.

Genus—CRISTELLARIA, *Lamarck.*

97. **C. rotulata*, Lamk. Lower Bed, rare.
98. **C. cultrata*, Mont. Lower Bed, rare.
99. **C. articulata*, Rss. Lower Bed, rather scarce.
100. **C. convergens*, Borne. Lower Bed, very rare.
101. **C. tricarinella*, Rss. Lower Bed, rare. Recent specimens have been obtained from three localities, all in the Western Pacific.

Genus—POLYMORPHINA, *d'Orbigny.*

102. **P. regina*, Br. P. & J. A few rather fine examples. Lower Bed.
103. *P. elegantissima*, P. & J. This fine species is most at home in recent waters on the eastern shores of Australia from Torres Straits to Bass Straits. In the Muddy Creek beds it is a common form, but very variable in contour. Specimens can be found in every intermediate stage, from a nearly circular outline in one direction to sub-cylindrical in elongated varieties. Lower and Upper Beds, common.
104. *P. oblonga*, d'Orb. Lower Bed, very rare. Upper Bed, rather scarce.
105. *P. gibba*, d'Orb. Lower Bed, a moderately common form, including some fistulose examples. Upper Bed, rather scarce.
106. *P. lactea*, W. &. J. Rare in both Lower and Upper Beds.
107. **P. lactea*, var. *oblonga*, Will. Lower Bed, very rare.
108. *P. communis*, d'Orb. Rather scarce in both Lower and Upper Beds.
109. **P. ovata*, d'Orb. Lower Bed, rare.
110. **P. dispar*, Stache. A strong, compressed, inequilateral and twisted shell, determined by Prof. Stache from examples obtained from the New Zealand Tertiaries. Lower Bed, moderately common.
111. †*P. rotundata*, Born. Upper Bed, rare.
112. †*P. compressa*, d'Orb. Upper Bed, moderately common.

Genus—UVIGERINA, *d'Orbigny.*

113. **U. Canariensis*, d'Orb Lower Bed, rather scarce.
114. † *U. pygmaea*, d'Orb. Upper Bed, very rare.

Genus—SAGRINA, *d'Orbigny*.

115. **S. limbata*, Br. Pl. i., fig. 7. A single specimen of this very rare form was obtained from the Lower Bed. The test is longer and more slender than Mr. Brady's figure, and is also more curved in outline, but in all essential features agrees perfectly with the type. The specimens on which the species was determined by Mr. Brady came from Torres Straits, and this is only one of the many illustrations of the identity of forms between the last-named locality and the Lower Tertiaries of Southern Australia.

FAMILY GLOBIGERINIDÆ.

Genus—GLOBIGERINA, *d'Orbigny*.

116. *G. bulloides*, d'Orb. Lower Bed, very common. Upper Bed, rare.

117. **G. bulloides* var. *triloba*, Rss. Lower Bed, rather scarce.

118. **G. inflata*, d'Orb. Lower Bed, rather scarce.

119. **G. helicina*, d'Orb. Lower Bed, rare.

Genus—ORBULINA, *d'Orbigny*.

120. *O. universa*, d'Orb. Lower Bed, very common, frequently large. Upper Bed, rather scarce.

Genus—SPHÆROIDINA, *d'Orbigny*.

121. **S. bulloides*, d'Orb. Lower Bed, examples small but moderately common.

FAMILY ROTALIDÆ.

Genus—SPIRILLINA, *Ehrenberg*.

122. **S. decorata*, Br. Differs from the recent form in possessing a rounded edge instead of being carinate, and in the absence of transverse furrows. Lower Bed, rare.

123. *S. tuberculata*, Br. Mr. Brady's figures show the convolutions as visible on the exterior surface, wholly or in part, but the Tertiary examples have a greater tubercular growth which completely hides the septal lines, and often renders the shell slightly biconvex. Lower Bed, rather scarce. Upper Bed, very rare.

124. **S. limbata*, Br. Lower Bed. Specimens small and somewhat rare.

125. **S. inæqualis*, Br. The convolutions of the superior face are strongly marked by raised, limbate ridges, with the depressed areas coarsely pitted. The inferior side of the shell is of greater extent than the superior, perfectly flat, shows no septal lines exteriorly, and is uniformly covered with tubercles. Lower Bed, rather scarce.

Genus—DISCORBINA, *Parker & Jones.*

The Discorbinæ of the Lower Bed are represented by a considerable number of species, but as individuals are almost without exception small and starved examples and in limited numbers. In the Upper Bed they are finer examples, and more numerous, and include several species not found in the Lower Bed.

126. *D. turbo*, d'Orb. Lower Bed, rather scarce; Upper Bed, very common.

127. *D. rosacea*, d'Orb. Rather scarce in both Beds.

128. *D. globularis*, d'Orb. Lower Bed, rather scarce; Upper Bed, rare.

129. **D. Araucana*, d'Orb. Lower Bed, rare.

130. **D. Bertheloti*, d'Orb. Lower Bed, rare.

131. *D. biconcava*, P. & J. Much compressed bilaterally. Lower Bed, rare; Upper Bed, rather scarce.

132. **D. patelliformis*, Br. Lower Bed, rather scarce.

133. **D. orbicularis*, Terq. Lower Bed, rare.

134. **D. (?) tabernacularis*, Br. If this be rightly assigned, it is a feeble example destitute of limbation, although resembling the species in other respects. Lower Bed, rare.

135. *D. polystomelloides*, P. and J. Lower Bed, a single example of this fine species. Upper Bed, rather scarce.

136. †*D. pileolus*, d'Orb. Upper Bed, rather scarce.

137. †*D. vesicularis*, Lamk. Upper Bed, rare.

128. †*D. Vilardeboana*, d'Orb. Upper Bed, moderately common.

139. †*D. opercularis*, d'Orb. Upper bed, rare.

140. †*D. rarescens*, Brady. Upper Bed, rare.

141. **D. cruciformis*, sp. nov. Pl. i., figs. 13, 14.

Test subglobular, slightly compressed laterally, consisting of about three convolutions arranged inequilaterally on a Rotaliform plan, so that usually four segments are visible on the inferior and about eight on the superior face. Segments inflated, their convex surfaces on the superior face studded with short thickly-set spines; sutural lines depressed, excavated, and free from spines. Inferior surface smooth, its four segments arranged in form of a Maltese cross. Umbilicus depressed. Aperture a small circular orifice situated in the umbilical depression. Average size, $\frac{1}{45}$ in.

This peculiar little shell is obese, but unequally convex. Its superior surface is rendered rugose by the presence of short spines so thickly set that they cannot be distinguished as spinous growths except by viewing them laterally where they terminate in an abrupt line. Its nearest analogue is perhaps *Discorbina pulvinata*, a new species obtained by Mr. Brady from two localities in Challenger material, viz., Admiralty Islands and Torres Straits. The species now described can be easily distinguished from the one referred to by its greater number of chambers, the

absence of ornamentation from its inferior surface, and the cruciform aspect which the final whorl of chambers assumes. Lower Bed, moderately common.

Genus—PLANORBULINA, *d'Orbigny.*

142. **P. mediterranensis*, d'Orb. Lower Bed, rare.

143. **P. acervalis*, Br. Lower Bed, a single example, but characteristic.

144. **P. larvata*, P. and J. A very symmetrical discoid test, often developing on superior surface tubercular growth of shell substance. In the recent condition it is an exclusively tropical species. The specimens from Muddy Creek are rarely tuberculated, but exhibit a smooth flat test with regularly imbricated margin. Lower Bed, moderately common.

Genus—TRUNCATULINA, *d'Orbigny.*

145. **T. lobatula*, W. and J. Lower Bed, rather scarce.

146. **T. variabilis*, d'Orb. Several irregular-growing examples have been referred to this species. Lower Bed, rare.

147. *T. reticulata*, Czjzek, Lower Bed, moderately common. Upper Bed, rare.

148. **T. echinata*, Br. A globose shell with large circular aperture, the surface of test more or less studded with short blunt spines irregularly distributed. In the recent condition it is mostly a coral-reef species. Lower Bed, rather scarce.

149. *T. echinata*, var. *lævigata*, var. nov. Pl. i., fig. 8.

Closely resembles the typical form in general features, but is devoid of all spinous appendages, the exterior surface of test being perfectly smooth. The aperture is also less conspicuous than in *T. echinata*, and has no bordered rim as in that form. It is more common than the type in the Muddy Creek material, and as such seems to require at least a varietal distinction. Lower Bed, moderately common. Upper Bed, rare.

150. *T. Ungeriana*, d'Orb. Lower Bed, common. Upper Bed, rather scarce.

151. *T. Haidingerii*, d'Orb. Lower Bed, rather scarce. Upper Bed, rare.

Genus—ANOMALINA, *d'Orbigny.*

152. **A. rotula*, d'Orbigny. Lower Bed, rare.

153. *A. ammonoides*, Rss. Lower Bed, moderately common. Upper Bed, rare.

154. **A. polymorpha*, Costa. Three examples, two of which are spinous. Lower Bed.

Genus—CARPENTERIA, *Gray.*

155. **C. proteiformis*, Goës. Very fine examples up to two-fifths

of an inch in length. Large specimens sometimes branched, and contain over twenty chambers. This is the first record of this interesting species in a fossil condition. The nearest point of distribution in the recent state, so far as known, is Torres Strait, but the recent specimens do not appear to be so fine as those from Muddy Creek. Lower Bed, moderately common.

Genus—POLYTREMA, *Risso*.

156. *P. miniaceum*, var. *alba*, Carter. Small specimens, and destitute of colour. Whether the absence of colour be original or due to age and fossilization it is difficult to say. I have, however, classed them with the variety with which, in their present appearance, they perfectly agree. Lower Bed, moderately common. Upper Bed, very rare.

Genus—GYPSINA, *Carter*.

157. *G. globulus*, Rss. The spherical form of *Gypsina* differs widely as to the size of individuals, and is not uncommon in Lower Bed. Upper Bed, rather scarce.

158. *G. vesicularis*, P. & J. Examples of the typical hemispherical form are rare, these being replaced by individuals of a discoid shape, with thick rounded periphery, which are common in the Lower, and rather scarce in Upper Bed.

159. **G. inhærens*, Schultze. Lower Bed, rare. The "Challenger" collections of this species were limited to two localities, Bass Straits and south of New Guinea.

Genus—PULVINULINA, *Parker* and *Jones*.

160. *P. repanda*, Fichtel and Moll. The typical form, passing into and including the next in this list, are amongst the commonest forms in the Lower Bed material. Upper Bed, rather scarce.

161. **P. pulchella*, d'Orb. A very neat little shell, with limbate sutures. Lower Bed, common.

162. **P. Schreibersii*, d'Orb. The septation on the superior side of the test is obscure, but in other respects the examples agree with the above. Lower Bed, rather scarce.

163. **P. Berthelotiana*, d'Orb. A few specimens of a small, convex, many chambered, limbate shell, appear to belong to this species. Lower Bed.

164. **P. Partschiana*, d'Orb. Lower Bed, rather scarce.

165. **P. Patagonica*, d'Orb. Lower Bed, rare.

166. **P. Hauerii*, d'Orb. Lower Bed, rare.

167. **P. auricula*, Fichtel and Moll. Lower Bed, rare.

168. **P. oblonga*, Will. Lower Bed, rare.

169. **P. semiornata*, sp. nov. Pl. i., figs. 12*a*—*c*. Test subglobular, more or less compressed on superior face; periphery, obtuse

or rounded; convolutions few in number (generally three). Segments few (three or four in final convolution), and much inflated. Superior surface, ornamented by raised papillæ, or by thick exogenous shell-growth, with deep excavations at intervals, giving a roughly reticulate appearance to the test. Inferior surface highly convex, without ornamentation, and smooth. Sutures non-limbate, marked externally by depressed lines. Umbilicus slightly excavated, and usually possesses several large perforations. Aperture, an inconspicuous slit (sometimes spanned by shelly growths), situated on the umbilical margin of final segment. Large specimens measure $\frac{1}{16}$ inch.

A large shell, combining in some degree the external features of *Rotalia papillosa*, Br., and *Pulvinulina punctulata*, d'Orb. It can be easily distinguished by its nearly plano-convex outline, inflated chambers, and fewness of its segments. Its size renders it conspicuous in the material, but it is not very common. Lower Bed.

Genus—ROTALIA, *Lamarck.*

170 *R. clathrata*, Br. One of the new species of the "Challenger" collection. The home of this very striking form appears to be between Bass Straits and Cooks Straits, New Zealand, where it was taken at four stations, with a bathymetrical range of 275 fathoms. The only other note of its occurrence is at two stations on the west coast of Patagonia, but the specimens from the latter locality were small and not so characteristic. At Muddy Creek it is moderately common in Lower Bed and very common in Upper Bed.

171. **R. papillosa*, Br. With a single exception this is only known as a South Pacific species. The Challenger Report records it from eight stations, the majority of which occur in the neighbourhood of New Guinea and northern and eastern coasts of Australia. It is a rare form in the Lower Bed material, and the examples are not quite so globose in outline as the type.

172. **R. papillosa* var. *compressiuscula*, Br. A few not very characteristic examples occur. They are really passage forms between the present variety and *R. clathrata*. In the recent state it is usually associated with the type in distribution. Lower Bed, rare.

173. **R. calcar*, d'Orb. Lower Bed, rare.

Genus—CALCARINA, *d'Orbigny.*

174. †*C. rarispina*, d'Orb. The examples usually exhibit from three to six spines. Upper Bed, moderately common.

FAMILY NUMMULINIDÆ.

Genus—NONIONINA, *d'Orbigny.*

175. **N. umbilicatula*, Montagu. Lower Bed, rather scarce.

176. *N. depressula*, W. & J. Rare in both Lower and Upper Beds.

177. **N. stelligera*, d'Orb. Lower Bed, rather scarce.

Genus—POLYSTOMELLA, *Lamarck.*

178. *P. macella*, F. & M. A very common form in the Lower Bed material, including some fine examples. It seems to take the place of the more widely diffused *P. crispa*. Upper Bed, rather scarce.

179. *P. craticulata*, F. & M. Occurs as a recent form on the Australian Coral Reef. Rare in both Lower and Upper Beds.

180. **P. verriculata*, Br. Only known in the recent state from two localities off East Moncœur Island (Bass Straits) and Curtis Straits, Queensland. Lower Bed, rare.

181. †*P. imperatrix*, Br. The examples, although fine and striking, are not, as a rule, very characteristic. One example was noticed with well-developed spines. The test is invariably subangular, but rarely spinous. It is probably a varietal or intermediate form which cannot be more accurately classed. Upper Bed, common.

Genus—AMPHISTEGINA, *d'Orbigny.*

182. *A. Lessonii*, d'Orb. Mostly of the compressed variety. Lower Bed, moderately common. Upper Bed, rather scarce.

Genus—OPERCULINA, *d'Orbigny.*

183. **O. complanata*, Def. Specimens large and very common in Lower Bed.

184. **O. complanata*, var. *granulosa*, Leymerie. Examples with more or less of surface ornamentation are also common. Lower Bed.

Genus—NUMMULITES, *Lamarck.*

185. *N. variolaria*, Sowerby. This is the most common and striking of the foraminiferal forms in the Muddy Creek Lower Bed. Its occurrence in company with several other large and striking species gives the Lower Tertiary of Australia a foraminiferal facies very closely resembling beds of a similar age in the Northern Hemisphere. It occurs sparingly, along with examples of *Operculina*, in the Upper Bed, but it is very probable that both these forms in the Upper Bed have been derived from the older formation.

Genus—ORBITOIDES, *d'Orbigny*.

186. **O. Mantelli*, Morton (sp.). Mostly small specimens, common in the Lower Bed. One example is much larger than the average size, and is $\frac{2}{10}$ in. in diameter. A few subglobular examples, surrounded with fringe of delicate translucent chamberlets, might perhaps be referred to *O. dispansus*, Sow.

187. **O. stellata*, sp. nov. Pl. i., figs. 9—11. Test free, compressed, lenticular; peripheral margin attenuate, angular in outline, or produced at more or less regular intervals into flat spinous projections. Surface of test rough and vesicular, destitute of areolæ, but in well preserved specimens exhibits externally a few tubercles of clear shell substance. Primordial region occupied by one or more chambers of large size; chamberlets of medial disc, numerous, cylindrical, or roughly hexagonal in section, arranged in concentric annuli; investing chamberlets compressed laterally, arranged in successive layers on either side of the medial plane; septal partitions thin, except where columns of clear shell substance pass radially from the primordial region to the external surface of test. Spinous projections formed by intermittent extensions of chamberlets at the peripheral margin. Average size, $\frac{1}{8}$ inch.

This is an interesting modification of the genus in the direction of *Tinoporus*, but whilst simulating the latter in external appearances, it is destitute of the supplemental skeleton characteristic of that genus; and is clearly differentiated from both *Tinoporus* and *Gypsina* by possessing the duplex arrangement of segments, which marks-off *Orbitoides* so clearly from these genera. The periphery is sometimes produced into a thin carina composed of a single layer of chamberlets, which from their regularity of shape and disposition can be determined as extensions of the medial disc. The spinous projections, whilst seldom entirely absent, vary considerably in their number and arrangement. Specimens occur having the outline of an inequilateral triangle, and pass through every degree of variation in angular outline to that of a symmetrical arrangement of radiating spines, as in fig. 9, pl. i.; the thickness of the walls separating the chamberlets is relatively much less in comparison with the chamber cavities than is commonly the case in this genus, as shown in pl. i., fig. 10*b*. The primordial region, when examined in flat sections, is seen to consist of several large inflated and spirally arranged segments, which are not visible in the transverse section shown in fig. 10*a*. Figs. 11*a*—11*b* represent a large and very abnormal specimen assumed to belong to this species, having two medial planes growing at right angles to each other, so as to give a triangular or prismatic form to the text when seen in transverse section. Lower Bed, common.

General Remarks.

With regard to the Foraminifera, the Muddy Creek Beds contain one of the richest local fauna that is known, either recent or fossil. The rich gatherings from the Suffolk Crag (Pliocene) yielded 100 species, and the greatest number of species from any one locality in the British area in this formation was 62 species. The Lower Bed at Muddy Creek has yielded 163 species, and the Upper Bed 76 species. Of these 52 species are common to both formations, leaving a net total of 180 species and seven varieties for the section as a whole. Mr. Brady ("Challenger" Report) makes special mention of a remarkably rich dredging off Raine Island, Torres Straits, which contained a greater number of species in this class than any other haul made during the cruise, and included many rarities. There is a close resemblance in the number of species obtained from Torres Straits and Muddy Creek, whilst many of the rarer forms are common to both.

The stratigraphical distinction between the two beds of the section concerned is sufficiently marked from the fact that the Foraminifera common to both only amount to 28 per cent. of the whole. There is also a marked change in the general facies of the rhizopodal fauna as we pass from the lower to the upper geological horizon, pointing to a shallowing of the sea bottom, which is indicated not only by the relatively larger numbers of shallow-water species in the Upper Bed, but these are proportionately more numerous and better developed as individuals.

With regard to climatic conditions, the majority of the Muddy Creek Foraminifera point to a higher temperature prevailing in the locality of their deposition than is proper to such latitudes in the present day. A very large proportion of species are characteristically tropical, and a decided majority in each case have their geographical range, in the present, restricted to the tropical and warmer temperate zones. So far as can be determined, the following summary will illustrate the bathymetrical and climatic distribution of the species concerned:—

Bathymetrical Range.

Lower Bed—68 (49 per cent.) shallow; 39 (28 per cent.) moderately deep to deep; 32 (23 per cent.) unrestricted.

Upper Bed—42 (58 per cent.) shallow; 12 (16 per cent.) moderately deep to deep; 18 (25 per cent.) unrestricted.

Climatal Range.

Lower Bed—37 (26 per cent.) tropical; 47 (33 per cent.) warm temperate and tropical; 9 (6 per cent.) temperate; 48 (34 per cent.) cosmopolitan.

Upper Bed—13 (18 per cent.) tropical; 25 (35 per cent.) warm temperate and tropical; 2 (3 per cent.) temperate; 31 (43 per cent.) cosmopolitan.

In their geological range; the Lower Bed contains six species which date from Palæozoic times, five Trias, eight Lias, four Jurassic, 18 Cretaceous, 68 Tertiary, five Quaternary, whilst 37 have not been previously noted in a fossil condition, and three others only in Australian geology.

In the Upper Bed two have a Palæozoic record, three Trias, five Lias, three Jurassic, eight Cretaceous, 27 Tertiary, and 14 not previously observed as fossil forms.

The occurrence of *Nummulites variolaria* in very great numbers in the Lower Bed is of special interest as showing uniformity of palæontological features between the Older Tertiaries of Australia and rocks of a like age in Europe. The resemblance in this respect is still further shown by the occurrence of large examples of *Operculina* and other types which are commonly found associated with *Nummulites* in the Eocene Beds of the Northern Hemisphere, and which are also conspicuous species from Muddy Creek.

In the material gathered by the "Challenger" expedition, the Australasian region supplied a high proportion of the new species obtained in this department of marine zoology. It was therefore to be expected that the later geological formations of Australia would show more or less resemblance to the dredgings in the adjacent waters, and give geological examples of some of the new species found in a recent condition. Including the new forms described in this paper, 50 species occur in the list which are now recognised for the first time as fossils. The general resemblance, which the Muddy Creek Foraminifera bear to the recent species now inhabiting the northern and north-eastern shores of tropical Australia, is very striking, and would appear to indicate that in early Tertiary times either the tropical currents of the ocean bore more directly on the southern shores of the continent, or that the zone of tropical heat reached nearer to the Pole in the Southern Hemisphere, as it appears to have done in the Northern, at the beginning of the Tertiary period.

DESCRIPTION OF PLATE I.

Figs. 1—3. *Miliolina angularis*, sp. nov.

Fig. 1. Longitudinal aspect. Exterior of test broken on one facet exhibiting the shallowness of chamber cavity. x 17 diam. Fig. 2. Transparent longitudinal section. x 22 diam. Fig. 3. Transparent transverse section, made near the centre of test, exhibiting the spiralline arrangement of chambers and angular contour of shell. x 40 diam.

Figs. 4—5. *Spiroloculina Tateana*, sp. nov.

Fig. 4*a*. Lateral view of an oval specimen, x 33 diam. Fig. 4*b*. Peripheral aspect of ditto. Fig. 5. Lateral aspect of circular example. x 30 diam.

Figs. 6*a*—6*b*. *Hauerina intermedia*, sp. nov.

Fig. 6*a*. Lateral view of average specimen. x 20 diam. Fig. 6*b*. Peripheral aspect of same object.

Fig. 7. *Sagrina limbata*, Br. x 30 diam.

Fig. 8. *Truncatulina echinata* var. *lævigata*, var. nov. x 40 diam.

Figs. 9.—10*b*. *Orbitoides stellata*, sp. nov.

Fig. 9. Lateral aspect of regularly stellate example. x 13 diam. Fig. 10*a*. Transparent section through centre of test at right angles to medial plane. x 17 diam. Fig. 10*b*. Small portion of same section more highly magnified showing column of clear shell substance and the relative thinness of chamber walls. x 75 diam.

Figs. 11*a*—11*b*. Probably an abnormal example of *Orbitoides stellata*, possessing two medial planes growing at right angles to each other. x 12 diam.

Figs. 12*a*—12*c*. *Pulvinulina semiornata*, sp. nov.

Fig. 12a. Superior aspect showing rugose shell growth. x 30 diam. Fig. 12*b*. Inferior aspect of same object entirely destitute of ornamentation. x 25 diam. Fig. 12*c*. Peripheral view. x 25 diam. The final segment in this example is broken and a specimen of *Lagena sulcata* has become fixed in aperture of test, as shown by figs. 12*b* and *c*.

Figs. 13—14*b*. *Discorbina cruciformis*, sp. nov.

Fig. 13. Superior aspect of test. x 40 diam. Fig. 14*a*. Peripheral view of another example. x 40 diam. Fig. 14*b*. Inferior aspect of ditto.

Description of a New Genus and Species of Locustidæ.

By J. G. O. Tepfer, F.L.S.

[Read June 7, 1889.]

Hectoria, *gen. nov.*

Male (imago and nymph).—Body stout, short, somewhat compressed laterally.

Head rather small; vertex raised, somewhat globose above, and forming a short ridge between the antennæ, with abrupt sides, a fine furrow lengthwise, and separated by transverse furrows at either end.

Eyes rather small, very prominent, ocelli not apparent.

Palpi long, slender, joints cylindrical, last joint slightly thickened towards extremity; tips rounded.

Antennæ extremely slender, setaceous, fully twice the length of the body or more, finely ciliated towards the tips; base below and inwards surrounded by a narrow ridge; joints cylindrical, very numerous; first joint very stout, a little longer than thick; second somewhat shorter and half as thick; third again diminished in the same proportion; the remainder nearly of the same length and gradually tapering to the end.

Thorax stout, narrow; sides straight, flat. Prothorax with a steep saddle-like depression near the front, continued along the side in the form of two or three shallow closely adjoining furrows; anterior part raised, hood-like, triangular, hollow in front, and terminating in an acute point; posterior pronotum about four times longer, lateral edges indistinct, raised semi-globosely, and terminating in a stout, oblique, conical spine on each side. The middle dorsal shield extends somewhat beyond the base of the forewings, where the lateral margins ascend obliquely at an angle of about 40°, meeting at a sharp point over the base of the abdomen. The middle of the pentagonal area is occupied by a high lentil-shaped hollow crest, with a circular, notched margin in front and above; its surface is traversed by six distinct main veins starting from the base near the front, which emit a few longitudinal branches, and more numerous but less distinct transverse veins. The sides descend very low, the rounded margins forming a narrow recurved ridge. The meso-and metathorax are much higher and stronger than the prothorax, the sides flat, straight, and separated by deep furrows. The pro- and meso-

sternum are narrow, depressed in the middle, the coxæ surrounded by distinct ridges; the metasternum entirely obliterated by the coxæ of the hind legs.

Legs slender, long; the posterior pair about two and a half times the length of the body, more or less angular. Tibiæ of all and the femora of the hind legs spiny. Tarsi four-jointed, stout; claws long and slender. Auditory areolet oval, large, free.

Abdomen compressed, subconical, twice the length of head and thorax together; segments, ten dorsal and eight or nine ventral, former along medial line overlapping and forming acute points; ventral plates subquadrate, surrounded by a narrow ridge. Anal plate deeply emarginate; cerci short, finely ciliate, and curved inwards.

Tegmina and wings more than twice the length of the body; slope very steep, except that of the interior area of the tegmina, which alone is horizontal in repose. The latter are thin, leathery, translucent, convex in front, concave behind, nearly of equal width throughout, tips rounded, border oblique; the costal area is broadly lanceolate near the base, contracts rapidly, and then narrowly linear to the tip; the inferior area is triangular, broad at the base, but short, being scarcely one-fifth of the total length of the tegmina, and almost wholly occupied by the stridulating apparatus, consisting of several strong longitudinal veins (with slighter ramifications through the transparent membrane) in the right wing, and a very stout transverse vein, with some smaller in the left one. The discal area is several times larger than the others together, and nearly of the same width throughout, except near the base. Subcostal vein very strong, transverse branches stout, often in pairs, ultimate reticulations very numerous, meshes irregular.

Hindwings somewhat longer than tegmina, transparent, and delicate; tips rather acute, border very oblique, interior margin short; thirteen almost straight radiating veins, of which only the subcostal emits oblique branches, all being connected by mostly rectangular, simple, more or loss straight transverse branches.

Hectoria Pontoni, *sp. nov.*

Pale dull green. Eyes dark brown, shining. Crest yellowish-green, margin deep brown to black. Tegmina, costal area with obliquely transverse brown lines and spots; discal area with nine or ten short broad transverse brown bars (some double, others irregular) between the subcostal and medial veins, besides eleven narrowly linear ones beyond the latter, and a number of small spots near the border and interior margin. Legs banded with brown; femora of the anterior and medial legs have three, the tibial two bands, those of the posterior legs four bands each, the last ad-

joining the tarsi, which are also brown. The femora of the fore-legs are smooth, those of the middle and hindlegs with two rows below, the two preceding the last much larger, and connected by a thin high ridge. The tibiæ of the fore and middle legs have two inferior rows, the hindlegs superior, about fourteen in each, and nearly of the same size. All the spines correspond in colour with the part adjoining.

The male nymph is similarly marked, but the darker brown preponderates, while the dull green is replaced by yellowish tints. The imperfect wings are rather long, promiscuously directed obliquely upwards, and closely applied to each other over the back. The crest is nearly as well developed as in the adult. Length of body, one inch ; span of wings, four and a half to five inches.

This genus will have to be placed near to *Phylloptera* and *Phaneroptera*, with which it agrees in general habitus, but it has also through the dorsal appendages some affinity with *Heterodes* and *Megapoda*—in fact, it removes one of the distinctions between the Locustidæ and Acrididæ, viz., the absence of crests in the former and presence in the latter. However, the form of the antennæ, palpi, tarsi, &c., place it unquestionably among the former.

The first intimation of this very interesting insect was received through Mr. J. M. Bagot, who forwarded a nearly mature male nymph to the Museum, obtained in December, 1885, about Terowie. The next, an adult male, was captured by Mr. F. H. Ponton, near Beltana, during the early part of last May. The finder informed me that he captured it in his room one evening, where it, no doubt, was attracted by the light. These are the only specimens known. The female will most likely be little different in general aspect, but furnished with a long ovipositor. The habitual food plant will probably be some of the Melaleuca species or else the Native Pine.

On some South Australian Polyzoa.

By P. H. MacGillivray, M.A., M.R.C.S., F.L.S., Corr. Memb.

[Read June 7, 1889.]

Plate II.

The present paper contains a list of South Australian Polyzoa, which I have recently had occasion to examine. They were mostly contained in a parcel sent for identification from the Adelaide Museum, but include also some given to me by the Rev. Dr. Porter. The total number of species is 64, of which four are now described for the first time. It is hoped that this very imperfect list may serve as a nucleus to which South Australian naturalists will add many of the other species which undoubtedly occur on their coasts.

The Australian seas are peculiarly rich in Polyzoa, from Victoria alone upwards of 360 species having already been recorded. Most of these have been obtained in the neighbourhood of Port Phillip Heads, where, mainly owing to the skill and indefatigable industry of Mr. J. Bracebridge Wilson, a more extensive series has been found than is known to occur in any equal extent of sea elsewhere. There is every reason to believe that parts of the South Australian coasts, notably the Backstairs Passage, when systematically explored, will yield an equally rich harvest.

CLASS POLYZOA.

Order I.—Phylactolæmata, *Allman.*

Suborder I.—Lophopea, *Allman.*

FAMILY PLUMATELLIDÆ.

Plumatella, *Lamk.*

P. Aplinii, McG. Torrens River.

Order II.—Gymnolæmata, *Allman.*

Suborder I.—Cheilostomata, *Busk.*

FAMILY AETEIDÆ.

Aetea, *Lamx.*

A. anguina, Linn., sp. Encounter Bay.
A. recta, Hincks. Glenelg.

FAMILY CATENICELLIDÆ.

CATENICELLA, *Blainville.*

C. lorica, Busk. Glenelg.

C. ventricosa, Busk. St. Vincent's Gulf; Encounter Bay.

C. hastata, Busk. Glenelg; St. Vincent's Gulf.

C. cribraria, Busk. St. Vincent's Gulf; Encounter Bay

C. rufa, McG.

C. margaritacea, Busk. Glenelg; St. Vincent's Gulf; Spencer's Gulf.

C. elegans, Busk. Glenelg; St. Vincent's Gulf; Spencer's Gulf.

C. Dawsoni, Wyv. Thomson. Some fragments occur which seem referable to this somewhat doubtful species.

C. fusca, McG.

C. crystallina, Wyv. Thomson.

CALPIDIUM, *Busk.*

C. ponderosum, Goldstein, sp. St. Vincent's Gulf.

FAMILY CELLULARIIDÆ.

CELLULARIA, *Pallas.*

C. cuspidata, Busk.

SCRUPOCELLARIA, *Van Beneden.*

S. scrupea, Busk. Some very imperfect fragments.

MENIPEA, *Lamx.*

M. crystallina. Busk, sp. St. Vincent's Gulf.

M. Porteri, n. sp. Pl. ii., figs. 1—1*b*.

Zoarium dichotomously branched, branches articulated by double tubes. Zoœcia biserial, about 5-7 in an internode, elongated and narrowed downwards; aperture elliptical and occupying about two-thirds of the front, margin slightly thickened; three spines, the lower clavate or bifurcate, on the outer side above, and two simple spines on the inner side; scutum large, lamina expanded, peduncle narrow. Lateral avicularia rare, large, situated on the upper part of a zoœcium, rostrum with a sharp, curved beak, the narrow mandible directed horizontally outwards. No anterior avicularia. Oœcia large, rounded, with a row of round foramina along the upper edge.

This species, which I dedicate to the Rev. Dr. Porter, from whom I first received a specimen, grows in small tufts, not exceeding half an inch in height, on algæ. The scutum is large, somewhat reniform and saccular. The lateral avicularia are rather scarce, many internodes not showing them and others having only one; they are of large size, although not always so

large as that figured. There are no anterior avicularia. The œcia are large, pearly, and have an irregular row of foramina along the upper edge.

FAMILY SALICORNARIIDÆ.

CELLARIA, *Lamx.*

C. australis, McG. St. Vincent's Gulf.
C. rigida, McG. Kangaroo Island.

FAMILY BICELLARIIDÆ.

BICELLARIA, *Blainville.*

B. grandis, Busk. St. Vincent's Gulf.

STIRPARIA, *Goldstein.*

S. glabra, Hincks.

BUGULA, *Oken.*

B. cucullata, Busk. Brighton; Kangaroo Island; St. Vincent's Gulf.
B. dentata, Lamx.
B. neritina, Linne, sp.

FAMILY FLUSTRIDÆ.

FLUSTRA, *Linn.*

F. denticulata, Busk.

CARBASEA, *Gray.*

C. pisciformis, Busk. St. Vincent's Gulf.

FAMILY MEMBRANIPORIDÆ.

ELECTRA, *Lamx.*

E. flagellum, McG. A very imperfect specimen.

BATHYPORA, *McG.*

B. bicolor, Hincks, sp. (*Membranipora bicolor*, Hincks, in Ann. & Mag. Nat. Hist., Feb., 1881.)

MEMBRANIPORA, *Blainville.*

M. pyrula, Hincks. St. Vincent's Gulf.

AMPHIBLESTRUM, *Gray.*

A. permunitum, Hincks, sp. St. Vincent's Gulf.

FAMILY MICROPORIDÆ.

THAIROPORA, *McG.*

T. Woodsii, McG. Glenelg.

T. Jervoisii, Hincks, sp. St. Vincent's Gulf.

T. Whittelli, n. sp.; fig. 2. Zoarium very narrow, linear, adnate. Zoœcia in regular transverse series, elongated, quadrate, separated by distinct thickened margins, membrano-calcareous in front, with a large transverse bullate enlargement immediately below the mouth; mouth rounded above, slightly narrowed below, a small mamilliform process on one or both sides.

I have much pleasure in associating Dr. Whittell's name with this elegant species. Its generic position may be somewhat doubtful, but its characters agree on the whole with those of the other species of *Thairopora*, from which it chiefly differs in the large bullate enlargement below the mouth. In the youngest zoœcia this part of the cell is marked off by a fine transverse ridge, between which and the mouth the enlargement becomes developed. It has no communicaiton with the main body of the zoœcium. The transverse arrangement of the zoœcia occurs also in *T. dispar* and *T. Woodsii*. The mouth is placed on a somewhat lower level, and slopes slightly backwards. I have only seen the specimen figured, and an examination of others would be desirable.

FAMILY CRIBRILINIDÆ.

CRIBRILINA, *Gray.*

C. monoceros, Busk. St. Vincent's Gulf.

FAMILY MICROPORELLIDÆ.

ADEONA, *Lamx.*

A. foliacea, Lamx.

A. cellulosa, McG.

A. grisea, Lamx.

ADEONELLOPSIS, *McG.*

A. foliacea, McG. Encounter Bay.

A. Zietzii, n. sp.; fig. 3. Zoarium encrusting. Zoœcia irregularly arranged, ovate, distinct; mouth subcircular with the lower lip hollowed, or semicircular with the lower lip nearly straight; surface tubercular and perforated, usually a large nodular mass below the mouth, and occasionally others similar at the sides; zoœcial pore subcentral, entire, or stellate. Oœcial cells large, surface with large nodosities round the margins, especially above, pores usually two or three, stellate, in a central depression; mouth wide, arched above, straight and projecting forwards below. St. Vincent's Gulf.

The specimens examined surround the stems of a small alga. They are of a leaden grey colour, owing to the presence of a rather thick epitheca. The whole surface is rough with small rounded nodules, among which, when the epitheca is removed by incineration, numerous small rounded foramina are seen, especially along the margin. There is usually a large, glassy nodule between the lower lip and the pore which it frequently overlaps and conceals. Other larger ones are also common to the sides of this and towards the margins of the cells. The pore is small and plain or slightly stellate. The œcial cells are very large, with numerous large nodules either round the whole margin or confined to the upper part, leaving a central depression in which are one or several stellate pores. The mouth is very wide, not so lofty proportionately as in the others, and has the lower lip straight or slightly convex. In many of the zoœcia at the lower edge of the suboral nodule is a minute avicularium with the point of the mandible directed upwards and the base resting on the pore.

FAMILY ESCHARIDÆ.

SCHIZOPORELLA, *Hincks.*

S. schizostoma, McG. St. Vincent's Gulf.

S. triangula, Hincks. Glenelg; St. Vincent's Gulf. The specimen of this occurs in the Hemeschara-form.

The zoœcia are very irregular in size and shape, confusedly arranged and separated by prominent raised lines. The œcia are abundant and very characteristic. The lower edge is produced downwards into one or more blunt processes, while a similar, sharper process rises upwards from each side of the zoœcial oral notch.

S. lata, McG.

The specimen of this species occurs as a beautiful branched and astomosing tube, which has evidently been moulded round a sponge, of nearly three inches in greatest extent, the diameter of the tubes being in some parts a quarter of an inch.

S. biturrita, Hincks. Brighton.

PARMULARIA, *Busk.*

P. obliqua, McG. St. Vincent's Gulf.

SMITTIA, *Hincks.*

S. Landsborovii, Busk. Kangaroo Island.

S. trispinosa, Johnston, sp.

The only specimen of this species is bilaminate, and forms a beautiful foliated ribbon-like zoarium extending up and round the narrow stem of a black alga for a distance of about three

inches, the ribbon at its widest part being about half an inch. The orifices of the marginal zoœcia are nearly circular, with a prominent denticle; in the older the peristome is much produced as in the var. *bimucronata*. The avicularia, when present, are usually large, by one side of the mouth, with the mandible pointed downwards. There are numerous oœcia with large perforations.

MUCRONELLA, *Hincks*.

M. Ellerii, McG. St. Vincent's Gulf.
M. papillifera, McG.

ADEONELLA, *Busk*.

A. platalea, Busk. St. Vincent Gulf.

FAMILY CELLEPORIDÆ.

LEKYTHOPORA, *McG*.

L. hystrix, McG.

CELLEPORA, *Fabricius*.

C. lirata, McG.
C. cidaris, McG.
C. verrucosa, McG.

SCHISMOPORA, *McG*.

S. costata, McG.

FAMILY RETEPORIDÆ.

RETEPORA, *Imperato*.

R. phœnicea, Busk. Kangaroo Island.
R. monilifera, McG., var. *sinuata*.
R. monilifera, form *arcuata*. A specimen occurs differing especially in the oœcium which it is desirable to distinguish. The zoarium, about three and a half inches in longest diameter, forms a tubular and calyculate mass. The fenestræ are oval, narrower than the trabeculæ. The peristome of the zoœcia is produced with a loop-shaped notch, on one side of which is a rounded avicularium. There are also frequent elliptical avicularia on the front of the zoœcia, and horizontal avicularia on the inner edge of the lower part of the fenestræ. The oœcia have an arched or angled beaded line or stigma without vertical extension. The posterior surface is faintly vitricate and granular, with small elliptical avicularia, especially towards the margin of the fenestræ.

I am not satisfied that the forms I have described as *munita* and *umbonata* should not rather be considered as species, in which case this would take similar rank.

SUBORDER II.—CYCLOSTOMATA, *Busk.*

FAMILY CRISIIDÆ.

CRISIA, *Lamx.*

C. acropora, Busk. St. Vincent's Gulf.

FAMILY IDMONEIDÆ.

IDMONEA, *Lamx.*

I. radians, Milne Edwards.

I. Milneana, d'Orbigny.

SUBORDER III.—CTENOSTOMATA, *Busk.*

FAMILY VESICULARIIDÆ.

AMATHIA, *Lamx.*

A. australis, Tenison Woods.

A. pinnata, Kirkpatrick.

A. distans, Busk. Of this I have examined two small specimens, not very perfect, but still sufficient to show their identity with the form described from off Bahia in the Challenger Polyzoa. It is readily distinguished from our other Australian species by the series of zoœcia describing a single—sometimes not quite complete—spiral round the upper half of the internodes.

VESICULARIA, *J. V. Thomson.*

V. bilateralis, n. sp.; fig. 4. Zoarium cylindrical, confervoid, branched, articulated, each internode giving origin to three arranged in a verticillate manner. Zoœcia disposed in two thickly clustered series on opposite sides of the branches, occupying the whole length except for a short distance at the base; ovate, length 0·4 mm., diameter about 0·25 mm.

The only specimen I have seen is probably a fragment of a larger mass.

EXPLANATION OF FIGURES.

Figs. 1 and 1*a*. *Menipea Porteri*, front view, magnified. Fig. 1*b*. Posterior view of same.

Fig. 2. *Thairopora Whittelli*, natural size. Fig. 2*a*. Two young zoœcia near the growing end, highly magnified. Fig. 2*b*. Two series farther back, showing fully-formed zoœcia.

Fig. 3. *Adeonellopsis Zeitsii*, two zoœcia, magnified. Fig. 3*a*. Small portion magnified, showing zoœcia and oœcial cell.

Fig. 4. *Vesicularia bilateralis*, natural size.

On the Geological Structure and Physical Features of Central Australia.

By J. J. East, Corresponding Member.

[Read April 2, 1889.]

Plate III.

TOPOGRAPHY.

In following the Overland Telegraph Line northward from the Flinders to the Macdonnell Ranges, the route traverses the Lake Eyre basin, and ascends a gentle slope to an elevated region in the heart of the continent.

Three principal divisions of country present themselves along the route, and may be termed—

I. "The Great Austral Plain."—A vast region of inconsiderable elevation, with some portions especially low-lying, and descending at the surface of Lake Eyre to about 20 feet below sea level.

II. "The Terraces." — The slopes and low parallel ranges which border the plain and form, as it were, a flanking terraced formation to

III. "The Great Central Plateau," whose furrowed southern face develops the system of narrow ridges collectively known as the Macdonnell Ranges.

Within the first division, and west of Lake Eyre, stands the *Denison* or Peake Ranges. They rise like islands from out of a plain of sands and clays, and are outlying portions of the Flinders Range.

I. The Great Austral Plain.

The surface contour is a level plain, with the horizon in every direction more or less broken by low flat-topped hills of uniform height, shaped like truncated cones, or else a low precipitous bluff, uniform in height with the cones, and forming the escarpment of a small "tableland" a few miles in area.

The hills and bluffs are almost destitute of vegetation. The arborescent growth is limited to acacia bushes, a stunted Eucalypt locally termed the "Box" or "Coolibah," and the crooked "Gidgia," a wonderful specimen of vegetable contortion; whilst on the plain, trees are rarely seen, but the hardy saltbush and cotton-bush abound for miles. Large patches of the level plains near the hills are perfectly sterile, and are covered with a

layer of smooth, glazed, rounded or subangular stones, set so closely together that the appearance is not unlike a pavement. The bare patches, or "gibbers," alternate with less stony or sandy areas and small shallow depressions, termed *claypans*. Where the stones are absent the saltbush abounds, and on the sand a few small bushes maintain a precarious footing; but the claypan is smooth and bare, the edges usually margined with a growth of samphire, and the surface white with a coat of salt-efflorescence.

The southern portion of this region presents its most extreme character, and is met with immediately after leaving the north termination of the Flinders Range.

As might be expected, this basin being the receptacle of a vast drainage area, there are some immense watercourses, which conduct the occasional flood waters to the lowest levels; but so gentle is the slope, and so local and irregular is the rainfall, that it is not an uncommon circumstance for the lower portions of the channels to be destitute of running water for years together. In fact, throughout the great plain a mild drought may be considered its normal condition; but heavy rains around its edges may send down a flood exceeding the capacity of the lower channels. Then the country becomes inundated for miles on either side; billabongs, saltpans and all depressed portions are filled to the brim, and the non-absorbent character of the clayey soil permits these waters to remain for long periods—perhaps till another flood—and furnish the only supplies of surface waters that man and beast can obtain.

After such an inundation the aspect of the country undergoes a complete and wonderful transformation. The dreary monotonous waste, which formerly only reflected the heated rays of the sun and the landscape of mirage and uncertain outline ever varying amid the air currents,—the very sight of which intensified the arduous nature of the traveller's journey, and begat an involuntary sense of fear and shrinking,—is succeeded by a magic growth of beautiful green sward, from out of which rise "geraniums," "parakylia" and succulent herbs delightful to animals and gratifying to man.

It is but for a short time, however, that the desert thus "blossoms as the rose." The great heat following after moisture induces a rapid growth, but only of ephemeral existence; and after a bush fire, or the more slow wasting due to natural causes, the country relapses into its normal condition.

The foregoing is especially true of the country east of Lake Eyre, where the Barcoo or Cooper's Creek brings down the storm waters of the Queensland coast range. From the slopes near Carpentaria, in the north, the flood waters follow the ill-defined channels of the Diamantina and Mulligan, while from the slopes

of the west and north-west, which reach to the summits of the Musgrave and Macdonnell Ranges, the waters come down the deeper channels of the Neales, Macumba, and Finke. Seldom, however, do the waters of those last-mentioned three creeks run right through to the lake. Their channels contain so much sand that the flood is absorbed before it has completed half the length of its course.

In fact, with regard to the longest and most important of these creeks—the Finke—it is extremely doubtful whether its waters ever reach the lake, but are not rather absorbed by the interminable waste of sandhills which lie along the west side of the Queensland border.

In the region lying south and south-west of the lake, the creeks are short and situated throughout their length in a country of exceptionally small rainfall, consequently this portion of the great plain presents the most arid and least-inviting part of its surface. This region would be altogether impassable to travelling stock, if storm waters were the only supplies obtainable, but at intervals forming easy stages the beds of clay of the plain yields to the pressure of waters beneath; and so at numberless points, the sites whereof are indicated by a low limestone mound, there is an oozing out of water sufficient and unfailing for the requirements of stock, but insufficient to create a running rill extending beyond the base of the mound. There it is either absorbed almost immediately, or a small reed-fringed pool may be formed, according to local circumstances or the amount of water issuing forth.

The belt of country containing these springs reaches from Hergott Springs all round the south and west sides of the lake. They become less numerous and more isolated as the distance increases westward or north. Dalhousie Springs is an outlying system to the northward, and is situated on the edge of the sandhill country in which the Finke loses itself.

All the country in which the springs occur has nearly the same relative level and, excepting the actual surface of Lake Eyre, is the lowest portion of the great plain.

Leaving the Spring Country and ascending the watercourses, the table-topped hills become more numerous and outlie more extensive areas of tableland. The plains or level parts are not so extensive, and the sandhills are a prominent feature only along the main valley bordering the channel. Patches of scrub, principally composed of mulga *(Acacia aneura)*, with occasional Casuarina (desert oak) and Eremophila, make their appearance. At first alternating with open grassy plots, the scrub gradually becomes more and more the prevailing feature as the limits of this first division of country is reached. Still higher up the creeks, their channels become deeper and more like gorges cut into the

tableland, whose surface is either stony or sandy, and whose edge is terminated by a bluff escarpment over-looking the lower plains, dotted with outlying detached flat-topped hills and patches of formerly-connected tableland.

II. The Terraces.

The second division of the county commences about eighty miles south of the Macdonnell Ranges, and consists of a number of parallel ranges of low altitude separated by broad valleys or plains. Each range and plain to the northward being higher than its neighbour to the south, their general aspect is that of a series of terraces constantly rising with a gentle and imperceptible slope to the foot of the great plateau whose southern edge forms the ridges collectively known as the Macdonnell Ranges.

The two great creeks, the Hugh and the Finke, which rise in the Macdonnells, run southward over this system of terraces and junction just on the edge of the Great Plain. Each has a channel as broad as the Murray at Morgan, and throughout their length the beds are filled with clean white sand as fine as that of the sea-shore. Large gum trees grow thickly on either side leaving only the mid-channel clear.

Such is the character of the numerous watercourses, which are marked on the maps as rivers, but whose real character is disguised under an equivocal name compounded of its patronymic and the definite article only. Thus we have not the *River* Finke, *River* Goyder, &c., but *The* Finke, *The* Goyder, *The* Macumba, &c., concerning which the observer must use his own intuitive perception as to whether it is a river, nullah, or gorge.

Water, whose presence might reasonably be expected on account of the vigorous tree-growth, is readily obtainable by sinking in the sand, while at a few localities local circumstances cause the water to appear at the surface, where its presence is immediately betrayed by a growth of rushes.

Explorers' routes were, of course, along these creeks, and the trade route naturally keeps in the same track.

The Ranges, as a rule, are densely wooded from base to summit by Mulga-scrub, except in those situations where bare rock or a cliff face renders vegetation impossible. A fig-tree is met with; and in the Finke channel below the Macdonnells, a glen is so productive of a *Livistona* that it has been named the "Glen of Palms." The plains between the ranges are mostly covered with mulga-scrub, comprising besides mulga, sheoak, myall, Grevillea, Hakea, and a peculiar looking Eucalypt *(E. gamophylla)*, locally termed "apple tree." The soil is usually a sandy loam, fairly grassed, but where open spaces of

sandhills occur the sands are bound together by the odious spinifex *(Triodia irritans)*, which grows in tufts about two feet in diameter.

This system of parallel ranges borders the Macdonnells on the south side throughout their whole extent. The drainage is to Lake Eyre, except the extreme western portion, which trends towards Lake Amadeus, another basin analogous to Lake Eyre, but at a higher level, being about 600 feet above the sea. The slope of which this division is formed may be considered to range from about 1,000 feet above sea at its lower edge to about 2,000 feet at its upper limit where it abuts on the Macdonnell Ranges.

III. The Central Plateau.

This plateau, of which the Macdonnell Ranges forms the southern face, is of a triangular shape, as far as its limits are at present known. The apex terminates between Alice Springs and the Queensland boundary, but towards the base it extends into regions still unexplored. Its mean altitude verges close on 3,000 feet, and the highest points are along the Reynolds and Strangways Ranges to the northward of the Macdonnell system, Mount Gardiner, in the former range, rising over 1,100 feet above the plain at foot, as determined by Mr. W. C. Gosse. The Reynolds Range, prolonged through the Strangways and Hart Ranges, has a general direction of E.S.E., while that of the Macdonnells being nearly east and west, a convergence of the two systems takes place in that section termed the Hart Ranges. The creeks originating in the Macdonnells, except those near the western end, run down into the Lake Eyre basin. The western drainage is towards Lake Amadeus, and it is probable were the supply of running water sufficient a large creek would traverse the whole length of the elevated plain between the Macdonnells and Reynolds Range and rounding the Macdonnell's western end fall into the Amadeus basin. North of the Reynolds Range the Lander, Hanson and Woodforde Creeks lose themselves on the plateau, but more eastward still the creeks originating on the north slopes of the Strangways and Hart Ranges being united into two large channels—the Sandover and Plenty—after a short northern course turn eastward, and rounding the apex of the plateau, enter the long sandy trough descending to Lake Eyre, and in which the main line of drainage is termed the Marshall River. This trough is a most desolate region of sand and spinifex, and appears to swallow up all the waters brought down by the Finke, Todd, Elder, Illogwa, Plenty and Sandover Creeks, which drain two sides of the great plateau. The tropic of Capricorn passes over the plateau just north of the Macdonnell ridges, and as might be expected of a region thus elevated under the

tropic, but in the heart of the continent, the climate partakes of the extremes of moist heat and cold dryness. The moisture is brought by the monsoon winds, which follow the sun down from the north coast, but the intense cold is due entirely to radiation under a clear sky after the monsoon has abated. At the head of the Hale River on the 11th September the thermometer ranged from 85° F. during the day to 19° F., or 13° below freezing, during the night. No snow or hoarfrost ever accompanies this cold, because there is not sufficient condensable moisture present in the air. Humidity follows on the great heat, and then is precipitated in torrents of rain, accompanied by electrical disturbances.

Vegetation of special nature only could withstand such climatic vicissitudes, and for this reason the perennial plants are few in species, though individually numerous and identical with those found in the terraced ranges to the southward.

The rainfall of the plateau, expressed in terms of mean annual average, is not suggestive in itself of aridity or drought, but when it is considered that this rainfall, though amounting to from 15 to 20 inches, falls in torrential showers of short duration, while the normal climatic conditions are those of excessive evaporation, it is immediately evident that the country's surface cannot partake of that moist condition essential to the continued growth of herbage. Beyond this also is the occurrence of long intervals without rain, when the only surface waters are those of some rock hole in a gorge whose precipitous sides shut out the sun's rays, or a hollow scooped in the creek sands by an eddy due to a projecting ledge of rock, marking the position of a rocky bar across the channel.

The creeks on the plateau are short and shallow, and at a few miles from the ridge, which gave them birth, they become lost by spreading over the level country. The plateau is a most arduous stage for travellers. Three times did Stuart essay to cross it before he succeeded, and still later Warburton and his party striking westward, fleeing as it were for their lives, succeeded in crossing it, possessed indeed of their lives, but destitute of almost every other thing with which they started. To the westward the scrubs give way to sand and spinifex to within the West Australian borders, but the north-west limit of scrub which turned back Stuart is unknown. Descending the eastern slope of the plateau, at no great distance from the telegraph line the traveller is again on the great Austral plain, so called first by Favenc, who crossed it from the coast range of Queensland through its full width to the plateau on which runs the telegraph line. The great plain there is a smiling country now rapidly becoming covered with cattle stations. The portions lying within South Australian territory is well known to the commercial world as the Herbert

River country, and is frequently said to be one of the best pastoral regions in Australia.

GEOLOGICAL STRUCTURE.

Outliers of the Flinders Range.

Soon after leaving Beltana in journeying northwards, the Flinders Range begins to break up, and except for the prolongation of the main chain towards Blanchewater and a less important spur towards Mount Nor' West, the primary rocks of which they are formed are lost beneath the gypseous clay formation of the Great Plain. Passing round the south and west sides of Lake Eyre, and ascending as high as the Neales River Valley, five outcroppings of granite and metamorphic rocks are met with. By their strike, sequence and composition, as well as their actual location, there is little reason to doubt but that they belong to the same system as the rocks forming the Flinders chain. The outcrops are :—

1. Finniss Springs.
2. Mount Margaret.
3. Peake.
4. Algebuckinna.
5. Mount Dutton.

Each of the localities are on a line, which, while running northward, recedes also to the west, so that the general direction of a line connecting them would be N.W. and S.E.

1. Finniss Springs.—At this locality a ridge of quartzite forms a low continuation of the Mount Nor' West Range prolonged through Hermit Hill. It forms good building stone, and from it the culverts and railway buildings along the line have been constructed.

2 and 3. Mount Margaret and Peake Ranges.—The outcrops at Mount Margaret and the Peake form the basal portions of the Denison Range, which runs from Anna Creek Station to Mount Kingston North, a few miles north of the Peake Telegraph Station. This range is of irregular outline, and composed of two very distinct systems of rocks. The uppermost series is a friable, white, sometimes chalky-looking, sandstone of considerable thickness, the upper portion being the most compact. Under it is a stratum of ferruginous cement, at times enclosing fragments of white and opaline quartz, at others being built up of ironstone nodules several inches in diameter, but which are simply crusts filled with white siliceous sand in a minute state of subdivision. This band of cement is but from a few inches to about five feet in thickness, and in turn rests on sandy argillaceous beds which graduate into a brittle blue clay weathering to olive-green in

colour. The whole series is horizontally stratified, and covers the primary rocks of the ranges to an altitude of about 400 feet above the sea. From about three-fourths of the eastern side of the range the country has been denuded deeply into the clay bed, which constitutes the plain extending to Lake Eyre. A remnant of the horizontal beds in places still clings to the face of the range, and a few flat-topped hills in the plain attest the depth of eroded strata. From Anna Creek to the Douglas the lower rocks are occasionally exposed by the almost complete removal of the sandstone and ironstone beds, but at Davenport Creek a sudden uprising of the strata takes place and culminates in the summit called Mount Margaret. This upraised ridge and the mount itself rise clear above the horizontal beds which fringe them. From Anna Creek to the Douglas the formation consisted of quartzite (very dense), sandstones and slates, the whole traversed by dykes of white felspar. Thin covering patches of the flat bedded sandstone and ironstone occupy the hollows between the undulations. The ranges are almost bare of vegetation, and standing on one of the peaks nearly east of Mount Margaret I could distinctly make out the strike and dip of the lower beds and their relation to the horizontal ones of the table lands. Mount Margaret is near the centre of an area of great dislocation and faulting. The southern ridge rises steeply from the eastward, and up its face of 200 feet I counted thirteen beds of brown, fine-grained, or compact quartzite intercalated with beds of talcose or mica-slate. The whole series dipping west at an angle of about 50 deg. The creeks which originate north of Mount Margaret run out eastward through gorges which give good natural sections and show the lowest bed to be a thick bed of conglomerate, formed of boulders of hornblendic, chloritic and micaceous schist cemented together by lime. In the cliff sections numerous caverns are seen; some large enough to contain three or four horsemen. They seemed caused by the dislodging of a nest of boulders by water filtering out from the sides of the gorge. Chloritic and talcose schists lie above this bed, and are succeeded in turn by the brown quartzites and talcose slates as displayed in the southern spur. Numerous dykes of granite containing very little mica or quartz seem to have been the first disturber of the strata, while a second disturbance was afterwards caused by extensive eruptions of syenite frequently so quartzose as to be termed a quartz-syenite. This quartz-syenite forms low hills about seven miles out on the plain north-east of Mount Margaret, at the base of which are some springs rising through the clay, whence the hill is termed Spring Hill. North of Mount Margaret the swelling, of which it is the culminating summit, again sinks down to the

level of the ironstone table-land and continues to Mount Denison in the Peake system of rocks. The metamorphic rocks of this system have the form of an arrow with its point to the southward. The Mount Kingston ridge represents the shaft while the quartzite ridge from Coppertop Hill to Mount Denison and thence north-west again to Peake Creek represents the barbs. Quartzite of reddish white colour, massive and compact, is the highest member of the series here. Under it are argillaceous, chloritic, micaceous and hornblendic schists, with bands of crystalline limestone which weather black on the surfaces, revealing small fragments of schist incorporated with it. Numerous outcrops of a coarse red granite with large felspar crystals intersect the strata, which have a most confused strike and dip, due to the granitic and syenitic eruptions which have taken place. South of the Telegraph Station the granite contains white mica and tourmaline in fair-sized black crystals. A sectional line across the ranges from Peake Telegraph Station shows three ridges, the first granite and schist, the second syenite of grey colour and schist, and the third of quartzites and talcose slates in thin bands, as seen forming the highest beds at Mount Margaret. Dykes of diorite of small dimensions traverse the schists and small veins of quartz containing oxide of copper and secondary formations of atacamite are common, but I saw nothing worth following up as a probable continuous metallic vein except the exposure to the west of the Telegraph Station. The sectional drawings will best convey the relative sequence of the rocks forming the ranges and the table-land deposits which occur in their hollows or on the flanks of the range. The line of the Peake Creek as it comes through the range is evidently that of a great fault, wherein the range and its granite core have been disturbed by subsequent forces. On the middle ridge, west of the Peake Station, are some fragments of schistose rocks forming a breccia-capping to the hill. The fragments are angular and evidently not waterworn to any very appreciable extent.

4. ALGEBUCKINNA. — Where the telegraph line crosses the Neales River schists are seen, traversed by granite and quartz-syenite-dykes; in the schists are pale garnets of small size, and some strings of rich copper ore similar to that at Peake; large reefs of magnetic iron accompany the syenite. The channel of the creek has an exposure of metamorphic rocks, &c., for about two and a half miles in length. The banks of the channel are about 90 feet high, and about one mile apart. The sectional drawing shows the bank to be composed of impure kaolin resting directly on the metamorphic series, having overlying beds of coarse and fine gravel, with thin clay partings, and the whole capped by a six to 12 feet stratum of very hard, coarse-grained,

brown sandstone, which breaks with a sharp cutting edge. In solution of potash it becomes friable after long digestion. This place is known as Algebuckinna goldfield, and was first discovered during the telegraph construction, but the discovery was not disclosed to the public till about two years ago. The actual channel of the river is filled with a drift of alluvium about 18 feet deep where deepest sinkings have been made, but the locality being one of those few places where waterholes occur, the influx of water prevents full exploration. The gold of this recent alluvium is apparently derived from the coarse gravel stratum overlying the kaolin, as gold is found in it, and the richest finds have been made in the talus immediately under it. The gold is very pure, and brought £4 per ounce at the Melbourne Mint. In appearance it is sharp, and the presence of crystals of black ironstone embraced among its projecting parts proves conclusively that it has not travelled far. About three miles up stream is the Ockendon Creek, which junctions here over gneissoid schists, among which are quartz leaders carrying pyrites; and possibly it is from this locality that the gold has been derived, although I could not detect gold in the quartz I examined. Ten miles north-west of Algebuckinna is the

5. Mount Dutton Range, which lies about ten miles north-west of Algebuckinna, I did not visit; but as our route passed within two miles of its northern end, I was enabled to distinguish a succession of beds in appearance like those of the Denison quartzites and slates.

This was the last exposure of metamorphic rocks for the next 350 miles, and the conclusions warranted from the examination of their series are the following:—

1. They are probably outlying portions of the Flinders Range, as their rocks agree in strike, sequence, and mineral composition with that portion nearest the plains.

2. They are probably a chain of archæan islands which occupied a shallow sea, as evidenced by the conglomerate beds or breccias, the thick beds of quartzites, and continuous bands of limestone, in which schistose fragments are imbedded (though only perceptible when weathered).

3. After deposition of the schists, granitic eruptions raised the beds into ridges running nearly north and south.

4. Great erosion took place before the second period of eruptive rocks were intruded, and their action faulted, dislocated and greatly contorted the whole system; and as the mineral deposits are always in their vicinity, they were probably the mineralising agents of the system.

5. After another long period of erosion, during which the ranges received in great measure their present contour, a period

of depression followed, during which the table-land formation of clays were deposited on all points except the actual crests of the range.

6. Another uprising ensued, since which the table-land deposits have been continually undergoing removal, and now only portions remain flanking the range. Of this the eastern side, being on the side of quickest drainage, has almost disappeared, while the western side is still sufficiently continuous to form a great proportion of the range.

The Great Austral Plain.

We have already some knowledge of portions of the great plain through the geological observations made by the geologists of the the adjoining colonies near our boundary line, and public works undertaken by our own Government along the shores of Lake Eyre.

Long previous to the official statements recognising the Mesozoic age of the Lake borders, Professor Tate, then President of this Society, had critically examined all available data connected with the region, and declared positively in his anniversary address that a large Mesozoic formation, probably of Jurassic age, occupied a large part, if not the whole, of the Lake Eyre basin. Since then the deep bores of the Water Conservation Department and the continued collection of fossil evidence from various localities have changed the presumptive into positive, and we now know that the Tertiary and Cretaceous formations which extend west of the East Coast Range not only cross our boundary from the eastern colonies, but there is good reason to believe that in the latitude of Lake Eyre, at least, they extend right across our whole province. The furthest westward from which fossils have been obtained from this formation is on the Arkaringa Creek, about 70 miles west of the Peake, from which place a splendidly preserved portion of a cast of the *Crioceras australe* was procured by my brother (Mr. W. H. East), and through me presented to the museum of the Adelaide University, where it now is. Curiously enough, the only other specimen yet discovered is from the Flinders River, in Queensland, on the counter slope of the great plain, where its drainage turns towards the Gulf of Carpentaria. Fossils identical with those occurring at Mount Margaret were obtained by me from Dalhousie Springs; and at Mount Daniel, about 18 miles north of Charlotte Waters, I obtained *Lingula suboralis* and a piece of silicified coniferous timber which had been drilled by Xylophagas. A most remarkable feature throughout the whole region is the remarkable uniformity of the beds both in sequence and composition, This is well illustrated in the sections

of different localities naturally displayed, and in a manner most unmistakable.

The flat-topped hills and tablelands, which without seeming method or system occur throughout the whole of the Cretaceous basin now under discussion, are but remnants of the one vast deposit, now in part removed, but of the nature of which their faces are the typical sections.

The lowest stratum disclosed is a bed of blue clay, greenish when weathered, and more or less sandy in its upper portion. It lies horizontally, or nearly so; the clay is brittle and very retentive of water, and at considerable depths in it are thin seams of limestone made up of shells and casts, which are so brittle that an attempt to extract any probably results in destroying the specimen. Spheroidal masses of argillaceous limestone up to two feet in diameter are frequent; they do not contain any fossil remains, and are usually coated with a thin layer of gypsum. In fracture they break into perfect segments, proving the homogeneity of their structure, and that the form is not due to abrasion. The colour is "dark stone," but in thin edges of a translucent "honey colour." Gypsum is abundant in thin plates; it is to be remarked that I seldom met with it among the fossils, or rather the fossils seem to be situated down in the clay beds *below* that portion in which the gypsum is developed.

Above the blue clay is a stratum of argillaceous ironstone in form of nodules, concretions and thin sheets. It varies in thickness from a few inches up to ten or twelve feet, and seems to have been formed in fine sand, for most of the nodules are simply cases filled with white sand. On exposed places these nodules by weathering permit the escape of the sand, and then the aspect of the deposit is that of scoria from a huge smelting furnace. Near the Peake Range, this belt of ironstone is charged with fragments of semi-opal and quartz, and might fairly be termed a conglomerate rock. The quartz is evidently derived from the veins among the schists, forming the mass of the ranges, and is coarser the nearer the ranges are approached.

Above the ironstone band is a stratum upwards of 200 feet thick of a friable white sandstone composed of clear white grains of sand cemented together with an argillaceous paste. At times the paste is in excess, and then the faces of the hills and bluffs have a white chalky appearance, and sometimes, though rarely, contain gypsum in the portions near the ironstone band. Towards the top the grit becomes more compacted by infiltrated silica, and the top is composed essentially of a capping of porcelainised sandstone from one to six feet in thickness; in fracture it is evidently a sandstone, and the weathered surface has always a glazed appearance and superficial staining by oxide of iron.

When this capping surmounts a portion which is more argillaceous, the siliceous hardening and glazing gives it the appearance of baked earthenware. Veins of chalcedony are common among the planes of shrinkage, and nests of the same material furnish the so-called flint fragments which are so common throughout the region. This chalcedony varies from pure translucent specimens to the porcelainised sandstone just referred to, and it is easy to select pieces showing the different stages of transition.

This gritty bed represents the surface of the country before it was exposed to the erosive action of running water, and the height of the flat-topped hills attest the depth to which the creeks and wind have changed the contour of the country. From Charlotte Waters to Lake Eyre the erosion has extended down through the grits and for some distance into the blue clay, being deepest in the latter bed as Lake Eyre is approached. As a consequence the nearer the lake the greater is the exposed or uncovered surface of the clay through removal of the grits; the only vestiges of which now are the porcelain stones and ironstone nodules which constitute the "gibbers" or stony patches referred to previously as forming a feature of the surface of the great plain. Along the railway line at present constructing the only stone available for ballast are the gibbers, and but for their existence ballast would require to be brought from places beyond the plain. As it is they are cheaply and expeditiously raked together and wheeled on to the embankment.

This continuous bed of clay, whose surface is below sea level at Lake Eyre, abuts directly against the ancient rocks which form the Flinders Range and their extension north-westerly to the Peake and Mount Dutton, which thus forms the southern edge of the basin which encloses them. Northwards the clay-bed extends into regions where the rainfall is considerable and the ground more elevated, but over which water seldom runs at the surface. At whatever point, therefore, the lower side of this bed is brought near the surface of the ground, opportunity is afforded for waters to percolate below. This water having percolated to the limits of the basin, where it is bounded by impervious beds of older rock but little jointed, must necessarily remain pent under considerable hydrostatic pressure, which at length overcoming resistance, forces a way up through the clay in the neighbourhood of its abutment against the old walls. Lime is deposited around the mouth of the orifice as soon as the water comes to the surface, and the pressure eased. In this manner a mound is built up of travertine, which increases in dimension until the hydrostatic pressure is compensated, or, what is still more probable, until the orifice is closed by continual deposition along its sides, and then another spring breaks out at a lower level.

Iron is frequently present in the waters, and being also deposited in presence of decaying vegetation which accumulates at the spring among the crevices of the calcareous tuft, it has assumed a yellow ochre appearance not unlike powdered sulphur, for which, indeed, it was taken to be at a time when the origin of these springs was supposed to be volcanic.*

The temperature of the waters is variable in different localities, that of the three springs at Dalhousie Station was 73°, 79°, and 93° F., but I was informed that the largest one some miles northward was quite as hot as the hand could bear without suffering, though, like those at the station, perfectly palatable and tasteless.

The fact of the creek channels having cut down to the bed of retentive clay is the cause of many of them having large though not deep waterholes. Such an one is Algebuckinna; the Angle Pole waterhole is another; the Ross at Macumba and the holes at Charlotte Waters are other instances; and as a general premise it may be said that the deeper down in the bed the less sand, and consequently better holding ground obtains.

At Mount Daniel the sandy clay in which fossils occur is a yellowish one, speckled green with what is probably glauconite grains. The shells and wood are silicified, and jointing planes or shrinkage cracks are already coated with a thin film of porcelain. The channel of the Goyder separates this hill from Mount Townsend, which stands on the bank of the Finke, and displays well the usual section.

After leaving Mount Daniel and ascending the Finke channel the upper bed or sand grit gets thicker. The Finke being the main drain of this region should yield the best cliff sections. About a mile above Crown Point cattle station is Cunningham's Gorge. In this same grit and immediately above this gorge, the channel is strewn with large boulders of red granite, well rounded, and also some masses of a porcelain breccia, enclosing argillaceous schist fragments of several inches extent. No bed rocks are exposed in the channel, which seemed to be all of argillaceous beds surmounted by cliffs of porcelain-capped grits, and I looked in vain for some break in the country indicating a change of formation. As some of the boulders weigh about a quarter of a ton they cannot have been washed from any great distance, and I think most probably a bar of primary rocks representing an ancient ridge here comes up to the surface, but has now been eroded away or covered by the sandhills which obtain for the next 20 miles to the northward. This seems probable, because at 18 miles higher up stream the cliff section reveals a

* This substance was examined in the University laboratory by Mr. A. W. Fletcher, and found to be persulphate of iron. On ignition it gave off a slight odour of burnt organic matter.—EDITOR.

ridge of argillaceous and hornblendic schists, having a central core of red granite, crossing the county in an E.N.E. direction, but which is covered by at least 70 feet of wind-drifted sandhills. Approaching this exposure the cliff banks are clays and sand-grits, very micaceous, and abounding in gypsum slabs. The flat-topped hills stand back some distance from the channel, as shown in the sketch. Rolled granite boulders occur on top of the dyke and on the schist below, evidently having been worn by water. The channel is over a quarter-mile wide, and the depth from top of the sandhill to surface of the sand in the creek is about 125 feet by aneroid. The clay bed rests against the schist almost horizontally on either side, and on the up-stream side the water is impounded by the bar of schist, and is the cause of the small holes called Polly's Springs. There is so much salt in the clay, however, that it contaminates the water and renders it almost undrinkable and highly purgative. In the lower part of the schist or near the granite dyke a thin band of argillaceous schist is completely impregnated with almost microscopic specks of green copper ore. An assay of the rock by the Government assayer gave about ·18 of a per cent. of copper. The upper portions of the schist are argillaceous and intercalated with narrow bands of brown quartzite, similar to that in the higher beds of the Denison Range at Mount Margaret.

Thirty miles N.W. of this dyke, over loamy plains dotted with porcelain-capped hills, lead to the bank of the Finke, overlooking old Idracowna station. The cliff banks are of white grit, and from the north side they are surmounted for ten miles by a veritable sea of steep spinifex-covered sandhills. These abut against and surround a remnant of tableland, which has by sub-aerial influences been cut up into narrow sections of grotesque shape and singular aspect. One of them, which Stuart names Chambers' Pillar, stands on a pedestal of conical outline, composed of thin layers of friable greenish-white sandstone. The pillar is more argillaceous, and the summit for about six feet in depth is stained red by iron, and judging by fragments which are found below, is superficially glazed.

The two points on the pillar, which in Stuart's description are prominent objects, have in the course of 30 years been weathered to nearly the one level, wherein also the protective influence of the capping portion is attested by the dimensions of the pillar at the summit exceeding its middle girth. Around the north view the broken and detached hills are weathered into castellated shapes.

Hitherto no section has disclosed what underlies the blue clay bed, but at 14 miles north of the pillar the second division of country begins at Mount Charlotte ridge, the most southerly of the terraced formation.

II. The Terraces.

The Mount Charlotte ridge (fig. 5) consists of a purple fissile sandstone which rises about 200 feet above the sandy tract, which separates it from the Pillar and its neighbours fourteen miles to the south. The dip of the series being south at only 20 deg., but very precipitous on the north side and bare of vegetation; a good natural section is displayed about two miles east of the track. At the foot of the escarpment, the sandstone is underlain by a bed of argillaceous limestone arranged in mammillary concretions, the concretionary layers having manganese-dendrites between them, and what might be termed the nucleus of the concretion is singularly like the cast of a shallow shell.

Beneath this band is another close-grained argillaceous limestone, which leaves an insoluble residuum of quite one-third when treated with hydrochloric acid. Portions of this band have a minute oolitic structure so suggestive of foraminifera that it was only after Mr. W. Howchin, F.G.S., had made a microscopic section that it was settled they were not organic. Next following underneath is a thick stratum of calcareous sandy or earthy nature, very fissile and soft, and containing an immense number of thin veins of manganese and manganic ironstone. From this stratum, which weathers easily, the numerous nodules of manganese and ironstone, which covers large areas, is derived.

The lowest bed of all is a siliceous limestone, which weathers into a corrugated face like a very coarse file, and by its weathering exposes angular fragments imbedded in it, which are undistinguishable from the porcelain cap of the table-land.

This series, which in gentle undulations forms the terraces and parallel ridges, intervenes the whole distance to the foot of the Macdonnells. At Mount Burrell Station, a few miles further north, is the Whinham Springs of Stuart. The springs are due to an anticlinal fold which here crosses the Hugh. Just below the springs, the limestone exposed in the cliff dips south at 45 deg.; and immediately northward and continuing for many miles, the dip is north at a very low angle. This brings the different beds in view as an ascending series so far as the James Range, where a synclinal trough is well marked, and a well 190 feet deep pierced the fissile sandstone (which is here of white colour) and struck good water. North-west of Mount Burrell, the porcelain capping is seen on the eminences, but the aspect is not so prominent as on the grits of the table-land. It is evident, however, that the porcelainising action extended over the whole surface of the country, but of this more hereafter.

In the Waterhouse Range, a very clear synclinal trough is

seen in the banks of the Hugh between Owen Springs Station and the Undertree Well.

The sandy covering of the plains between the ranges conceals the rock formation below, and the flat-topped hills which occur in some portions of them were away from the track and therefore I was unable, through the exigencies of travel, to do more than surmise their probable structure.

III. The Central Plateau.

Seen first from the Waterhouse Range at Orraminna Pass, thirty miles away, the aspect of the Macdonnell Range forming the south edge of the plateau is anything but imposing. The narrow gaps in the range show no sign of other ridges beyond, and this one ridge can be plainly discerned by its overhanging scarped edge facing the north, and its foot sloping into the plain, to be an immense layer of rock which has been tilted up on edge.

This ridge is composed of an intensely hard red quartzite in layers of about six inches thick, but the layers have little or no cross jointing. It strikes nearly east and west, and rests directly on a very felspathic mica schist in which are bands of granite of coarse texture. Above the quartzite is a thick stratum of limestone, very impure and variable in composition. It may be best described as an immense number of thin bands of argillaceous and siliceous limestones with partings of argillaceous sandy matter often intermixed with seams of brown ironstone, and the whole mass pervaded by manganese dendrites.

At the gaps, which are about two chains wide, the different creeks which rise further to the north flow out on to the plain, and during rains form an extensive area of flooded ground, which is eventually drained by the Todd Creek. The gaps, commencing with the western one through which the telegraph line passes, are Temple Bar, Heavitree, Emily, Jessie, and the Slip-panel—the latter, as its name suggests, being so narrow as to be closed to cattle by a panel or so of fencing. Where the gaps open on to the plain the limestone is worn back for some considerable distance on either side, and the plain is strewn with stones of quartzite, porcelain and chalcedony. Between the gaps, however, the limestone foots the quartzite in the form of black-looking knolls, whose colour is due on its weathered faces to a superficial coating of manganese. The knolls of limestone reach, perhaps, 100 feet up the slope of the quartzite, and are covered with mulga. Above this the quartzite stands up three, four, and 500 feet red and naked, except where here and there a cycad maintains a footing among narrow crevices in the rocks. The summit is a narrow ridge, and the north side is a sheer precipice or steep escarpment caused by the breaking away of the undermined rock

to about half the depth of the side, and there the schists buttress it up, having their own slope covered with a talus formed of the fallen quartzite rocks. Standing on the ridge, the quartzite can be traced for miles to the limit of vision on either side. Varying little in apparent height, sometimes straight, sometimes sinuous, this thin red line holds its own in a general direction of east and west. Distinctly visible from this elevated position, the mass of upland country collectively termed the Macdonnells are seen to be composed of other ridges, all parallel and narrow, and inclined like the first. The rock tints and scarped edges leave no room for doubt as to their identical composition, and that they are situated along the edges of a line of faults which bring the same series and sequence of rock beds into view. Looking northward the country rises, and the quartzite ridges are but little elevated above the plain which extends to the Reynolds Range. Passing through Heavitree Gap, and following the telegraph line, Alice Springs is situated on a boss of coarse red granite, which has greatly disturbed the country. To the north ridge, beyond Bond Springs cattle-station, we pass over numerous intrusive dykes of diorite, which have faulted the granite and schists. Plates of mica two and three inches square occur in the granite. A descent of only 40 feet from the north ridge leads down to the tertiary alluvial covering of the plain. The system of diorite dykes, which are met with north-east of Alice Springs, do not continue beyond the Mount Benstead ridge, the last one being met with at Mount Benstead well, where the dyke, by forming a bar across Love's Creek, dams back the soakage waters, and affords a limited supply to the well.

East of Alice Springs. the Macdonnells are formed of two nearly parallel ridges, the Undoolya and Benstead, which dip south and strike nearly east and west. The Hart Ranges, with which they converge and junction, have also two main ridges, the Georgina or Bald Hill ridge and the Hart Range proper. This system runs E.S.E., and dips northerly. Love's Creek and the Ross drain the first two ridges, and the Hale or Elder the two latter. From the chaotic jumble of mountains which are caused at the junction of the Benstead and Georgina Ranges, a range which I have called the Elder Range runs south-eastward, and has been traced by me to lat. 24° S. A section drawn through the system from the Ross Creek across through the ruby-fields to the Plenty River shows a great anticlinal axis, with four main faults indicated by the four ridges mentioned. At the Ross, the limestone series is surmounted by a fissile purple sandstone, apparently identical with that found on the Mount Charlotte ridge. It forms a ridge with a steep escarpment on the north side, and with the limestones ascending about half-way up. Proceeding up the

gorge, a section of an anticlinal fold is clearly shown, the first stratum being near the edge of a fault in the limestone which runs near the foot of the escarpment just mentioned, and along which the Love joins with the Ross.

North of the fault or at the mouth of the gorge, the stratum is a white gritty sandstone similar to that of the tableland hills, and is capped with a red glazing. Portions of the glazed section have fallen to the foot in huge masses, and have rounded by weathering into shapes suggestive of the appellation of turtle-backs. Following this comes the fissile sandstone, weathered red, and then the limestone series, the different bandings of which are displayed in the cliffs in zigzag contortions of striking aspect. In this series is the "Bitter Spring," the water of which tastes like quinine, it has no ill effect on man, and the camels drink it as though they would never be satisfied. The length of the gorge now lies altogether in this series, except at the extreme north end, where the crown of the anticline is distinctly shown, and then the fissile sandstone, surmounted by the argillaceous glazed-grit, again appears The white grit, with its porcelain capping, is termed the "Made Hills" by the diggers, which are well-known landmarks.

Beyond the "Made Hills" a fault brings up the schists and granites again, and diorite dykes, running E.S.E. through it, are numerous. The creek now occupies the end of an elevated valley-plain about twelve miles long and four wide, whose sides are composed of quartzite ridges, the south one dipping southward and the north one—the Georgina Range—dipping northward. The plain is therefore along the crest of the anticline, and has been formed by the degradation of the schists, which are now covered by a Tertiary alluvium. There is one patch of limestone lying flat on it in thin layers, but I am uncertain as to its relationship. Eastwards the plain contracts to about a mile in width, and then granitic dykes of small dimensions, and numerous thin leaders of quartz rock are found in micaceous schist and hornblendic schists, with diorite dykes on the northern edge. The quartz veins carry small spots of galena, argentiferous grey copper ore, brown iron-stone, and free gold in cavities, evidently marking the site of decomposed pyrites. This is the Paddy's Hole Goldfield, and receives its name from a rock waterhole in the southern quartzite ridge. Passing over the anticline through a broad faulted portion of the Georgina Ridge, another system of auriferous quartz veins in the neighbourhood of diorite dykes is crossed in the descent to the Hale or Elder River. Beyond the broad valley of this watercourse, which has large gum trees growing in its sandy bed, the Hart Range rises, and is about 16 miles across, and consists of the same series of beds as the other range, but which, though greatly faulted, are more easily inclined, especially at the

junction of the Florence and Maud Rivers, where the limestone beds appear flat, and have been weathered into such peculiar shapes that they have been termed the Castle Hills. The upturned schists throughout this area are thickly pierced with diorite dykes and converted into a coarse granular crystalline rock composed of large crystals of white felspar and brown mica. In the vicinity of the diorite it is studded with garnets, and has frequently been alluded to as garnet-sandstone. In the shingle of the creeks, which flow down through this series, the waterworn garnets are plentiful and having a hardness above the typical garnet, and of fair colour, have been collected and put into the market as "Australian rubies." On the north side of the range, or at head of Florence River, the quartzite ridge dips northward, with limestone knolls at its foot, and the steep escarpment of Mount Mabelle beyond reveals the fissile sandstone which rests on it, and dips away into the great plain beyond, where flat-topped hills and plains are strewn with ironstone nodules and chalcedony pebbles. The laminar schist forming the core of the plateau and ridges is frequently of peculiar appearance, due to the size and predominance of its felspar crystals. They are visible when standing a considerable distance back, and are similar to what has been aptly termed "swellings and eyes" by German geologists.

On the north end of the Elder Range, dividing the Lizzie from the Illogwa, the schistose structure is horizontally disposed, and the formation has been weathered into cheese-ring cones, to which the "swellings and eyes" impart a peculiarly grotesque appearance..

In the valley of the Illogwa is the dyke from which are procured the large plates of mica recently brought down to market; tourmaline and beryl accompany it. Eastward the country is unexplored, save for Winnecke's track, near the Queensland boundary.

The Elder Range is joined at Glen Annie by the two ridges which come past the Paddy's Hole Goldfield, and Glen Annie is the gorge through the anticline by which the Hale or Elder escapes from the valley south of the Hart Range.

Eight miles lower down the Undoolya ridge joins, and there are one or two subsidiary quartzite ridges below; and then the river, as far down as I explored it, to lat. 24° 7′, passes through the formation of the terraces, as met with along the Orraminna route and the channel of the Hugh.

Conclusion.

It is evident that the triangular portion of the plateau just described has been the scene of deep-seated uplifting forces at a

period subsequent to the deposition of the terraced formation, and that a sectional line from the Lake Eyre basin to the top of the plateau is through a regular sequence of formations in descending order, with only the one interruption caused by the exposure of schist and granite on the Finke at Polly's Springs. That this schist-ridge was upheaved long antecedent to the deposition of the strata now surrounding it is certain, otherwise the beds would have been tilted and the terraced formation of calcareous strata brought to the surface. It is probably an outlying extension of the rocks forming the base of the Musgrave Ranges. The synclinal undulations of the terraces becoming more and more sharply curved in approaching the Macdonnells, and finally becoming faulted and dislocated along with the rocks forming those ranges, is proof that their folding is due to the upheaving of that mass, and therefore that this portion of the plateau has been upheaved since the deposition of the terraced formation. From Dalhousie Springs to the Everard Plain on the top of the plateau is 300 miles in a straight line, and from Lake Eyre the distance to the same point is 500 miles. By the beds of the watercourses which drain its surface, this section is one continued gentle slope passing from sea level up to 2,700 feet, and so uniform is it that there is not a waterfall, or even a rapid, throughout the whole extent of the main creek channels. With regard to the geological age of this region the presence of fossils on the face of the slope up to an altitude of 800 feet places us on pretty sure ground and shows the age of deposition to be Mesozoic (and probably Cretaceous). Farther up the slope there must exist doubt until fossils are actually discovered, though it is a reasonable presumption that the beds throughout belong to one great series. With regard to the Macdonnells and the plateau the conformability of the rocks is certain, but should their age be considered archæan solely on the ground of their high degree of metamorphism? The diorite eruptions have evidently been the chief cause of metamorphism, and to their general strike or direction the whole northern side of the plateau conforms.

Further, did this intrusion of diorite take place late in the Mesozoic period, and uplift Central Australia into dry land. In such a case the great and gently sloping swell would eventually be cut up by surface waters and wind. The continental climate thus engendered being similar to that now existing would seldom cause floods to deepen the watercourses, and we might rather expect short creeks which soon spread out over the surface and their waters thus completely evaporate, leaving behind the matters previously held in solution. The finest particles would be carried furthest by the running waters, and two classes of

deposit would be caused. The lower beds would consist of the finer clays and sediments, and the upper beds nearest the streams source be the coarser and more sandy. Waters containing lime in solution deposit it readily when relieved of pressure, and also its iron when flowing among materials which furnish carbonic acid. But silica which is held in solution by water is only precipitated on complete evaporation, and therefore a country which receives such waters must eventually be covered with a floor of chalcedony, or if previously a sandy formation, the upper surface must be changed to a porcelainised sandstone. Eventually drainage along a few main lines or channels would be determined, and creeks formed such as we now know. Their channels would be continually widening and undercutting the porcelain covering, which, breaking off for want of support, ever presents a new face to wear, until at length the whole would be removed, or a few symmetrically shaped conical hills with their porcelain cappings be left standing about the plain in all directions.

Is not this the condition of Central Australia to-day—the flat-topped hills with porcelain caps giving way to coarser-grained grits with only glazed surfaces, and intermixed with calcareous and ferruginous matter, as we approach the head of the present drainage system? And are not the metamorphic rocks at this source composed almost entirely of bisilicates, which waters charged with alkaline bicarbonates will rapidly attack and waste, thus furnishing the material for the phenomena stated? By such reasoning one is tempted to regard the red quartzite as no other than the bottom of the sea which washed still older rocks forming the heart of the plateau to the northward, and which plateau, by the uplifting of its southern seaboard, has been extended down to the Macdonnell Ranges. The appearance of dry land in Central Australia during secondary times must have an interesting bearing on other features of Australia too great to discuss now. One point may, however, be referred to, and that is the elevation which the south shore of Australia is still undergoing, as evidenced by the cliffs of the Great Bight and other phenomena visible along our littoral.

The description which Maw and Washington has given of the Atlas Mountains and plains of Morocco are wonderfully like the regions dealt with in this paper. Chalcedony-capped flat-topped hills dot the plain, and igneous rocks raise Cretaceous strata to heights of 5,000 feet; while French geologists have on the eastern end seen Jurassic strata still higher, and pierced with diorite rocks.

One subject which is of great interest to geologists is the occurrence of obsidian bombs scattered throughout the whole

region. I have one from the Everard Plain, but they are most numerous among the portions of the plain whose surface is strewn with chalcedony and ironstone nodules. I found none *in situ*, but in the Peake Range, and afterwards in the Macdonnells, I picked up in the creek-debris fragments of what is apparently sanidine felspar, but of which the parent rock was not seen.

EXPLANATIONS TO PLATE.

FIG. 1.—SECTION ACROSS SOUTHERN END OF THE DENISON RANGE.

1. Table land sandstone (Tertiary).
2. Blue clay and gypsum (Cretaceous).
3. Ironstone mass.
4. Argillaceous and talcose slates } Primary.
5. Quartzite bands in argillaceous and hydro-mica slates }

FIG. 2.—SECTION ACROSS MIDDLE PORTION OF DENISON RANGE.

1. Table land sandstone (Tertiary).
2. Blue clays and Gypsum (Cretaceous),
3. Granite.
4. Syenite.
5. Argillaceous and hornblendic schists.
6. Quartzite bands and talcose slates.

FIG. 3.—ALGEBUCKINNA GOLD FIELD, R. NEALES.

1. Sandy kaolin ⎫
2. Gravel cement (auriferous) ⎪
3. Sandy cement ⎪
4. Gravel cement } Tertiary.
5. Sandy cement ⎪
6. Gravel cement ⎪
7. Compact sandstone ⎭
8. Argillaceous and Hornblendic Schists with Garnets and Copper.
9. Granite dyke.
10. Quartz-syenite dyke.

FIG. 4.—TYPICAL ESCARPMENT OF TABLE LAND.

1. Cretaceous clays with beds of shell limestone and gypsum.
2. Bed of nodular ironstone.
3. White sandy grits often argillaceous.
4. Porcelainised sandstone.

FIG. 5.—SECTION ACROSS MT. CHARLOTTE RANGE, 12 MILES NORTH OF CHAMBERS PILLAR.

1. Sandy thin beds of shale with manganic ironstone.
2. Siliceous limestone.
3. Calcareous earthy beds with seams of manganic ironstone.
4. Argillaceous limestones of oolitic structure.
5. Fissile sandstones.

FIG. 6.—SECTION ACROSS MACDONNELL RANGES TO GREAT PLATEAU.

GUMS, AND A RESIN, PRODUCED BY AUSTRALIAN PROTEACEÆ.

By J. H. MAIDEN, F.L.S., F.C.S., &c., Curator of the Technological Museum, Sydney.

(Communicated by PROFESSOR RENNIE, M.A., D.Sc.)

[Read September 10, 1889.]

It is only of late years that the presence of gum in the Proteaceæ has been recorded. It has not even yet, the author believes, been noted as having been found on non-Australian species. In reproducing Deputy-Surgeon-General Shortt's statement as to the gum of *Grevillea robusta (infra)* the *Gardeners' Chronicle* excusably said (1882)—"The statement is a remarkable one, as none of the Proteaceæ were known to yield gum." The first record I can find of a Proteaceous gum is in Captain Lort Stokes' "Discoveries in Australia," ii., 132. The work was published in 1846, and he records gum from a Western Australian *Hakea*, termed "Holly" by the colonists and "Tool-gan" by the blacks. The second is a statement in the Catalogue of Western Australian Products at the Intercolonial Exhibition, Melbourne, 1866—"Gums of *Hakea* species are found *plentifully* (my italics) after the autumn rains." The next is by Dr. Cooke, who describes (1874) a sample of *Grevillea robusta* gum in the India Museum. This endemic Australian species is a common avenue-tree in Southern India and Ceylon. Then follow Surgeon-General Shortt's observations in South India in 1879-81 on gum of the same species. Still the same species yielded gum for Fleury's experiments in 1885, and the author now follows with records of the gum of five additional Proteads and the resin of a sixth.

These Proteaceous gums are not only of much botanical interest, but of high chemical importance. The present is the second occasion on which the presence of Pararabin has been recorded in any gum, so far as the author is aware. The first announcement of it having been found in gums is that of its discovery in *Sterculia* ("Kurrajong") gum by the author, and recorded in a paper in the *Pharmaceutical Journal* of London, vol. xix.) Pararabin had only been previously recorded from beetroot and carrots and from certain seaweeds. Pararabin differs from Metarabin in its solubility in dilute *acids*.

GREVILLEA ROBUSTA, *A. Cunn.*

"Silky Oak." Found in New South Wales and Queensland.

"In the India Museum is a sample of gum rather like that of *Moringa*, of a vinous-red colour, and but little soluble. It is said to have been obtained from this tree, which is cultivated to a limited extent in Mysore. It has a bright shining resinoid fracture, which it retains. It is much mixed with pieces of friable bark, to which it adheres. The gum is only botanically interesting" (Cooke, "Gums and Resins of India").

In some notes on the Shevaroy Hills for 1881, by Deputy-Surgeon-General Shortt, the following passage occurs:—"Of the plants introduced in these hills, I have to notice a peculiarity as regards *Grevillea robusta*. One tree, which is now eleven years old, has for the last two years during the rains produced spontaneously each year about ten ounces of a translucent gum, which has no smell or particular taste, is of a pale yellow colour, and mixes readily with water, when it forms a whitish-brown coloured mucilage, and as a paste answers all the purposes of the so-called gum arabic for adhesive purposes. The other Grevillea trees are some two or three years younger, and have not as yet evinced any disposition to produce gum." This finding of a gum so adhesive in the Proteaceæ is not borne out by the author's experiments.

Fleury experimented upon gum of this species from Algeria (*Journ. Pharm.* [5], ix., 479-480; *Journ. Chem. Soc.*, xlviii., 238). He speaks of it occurring "frequently," and being similar in appearance to cherry gum. It is yellowish-red, slightly translucent, and slightly friable. In water it swells a little, and slowly produces a very persistent white emulsion, which passes through all filters. It contains no starch, but gives 3 per cent. of ash, principally calcium carbonate and a little potash. The emulsion, treated with absolute alcohol, gives a copious precipitate of gum proper. When the alcoholic solution is evaporated it gives 5·6 per cent. of a reddish transparent resin, with slightly acid properties; this is soluble in alkalies and carbon bisulphide.

Common as this species is in this its native country of Australia, it has not yet been my good fortune to find any gum on it. M. Fleury's specimen is almost a gum-resin; exudations from a *Hakea* and a *Xylomelum* examined by me yield true gums, with not a trace of resin. But *Grevillea striata* yields an exudation which is mainly resin, so we must come to the conclusion that the Proteaceæ yield both gums and resins.

GREVILLEA STRIATA, *R. Br.*, B. Fl., v. 462.

"Beef-wood." Found in South Australia, New South Wales, Queensland, and Northern Australia.

This particular sample came from Whittabranah, Wilcannia, N.S.W. It weighs several pounds, and was obtained in large pieces from two average trees, without using a ladder. Out of reach there was about an equal quantity to be seen, and which was left on the trees; a large quantity was also found lying on the ground, partially decomposed. It was so hard on the trees that a hammer and chisel were necessary to remove it.

It is quite free from odour, and has a dark reddish colour. When pure it has a bright fracture, but much of it is mixed with woody matter in a fine state of division. The warmth of the hand is sufficient to cause the resin to adhere to it. It sticks to the teeth, but is without taste. It is reduced to powder with the utmost facility, forming a dull powder. It is rather opaque looking.

In cold water the substance whitens slightly. If the water be boiled, the liquid becomes very turbid, reminding one of coffee with excess of milk and with abundant "grounds." No odour is developed.

Petroleum spirit extracts 5·2 per cent. of a hard, transparent, brownish resin.

The residue is acted upon by alcohol, which extracts 60·1 per cent. of a brownish resin.

This residue is then digested in water, which extracts 5·6 per cent. of a yellowish substance, consisting chiefly of arabin. The residue consists of 26·5 per cent. of a brownish substance which swells enormously in water, and which consists of metarabin (14 per cent.), while the remainder is accidental impurity.

Summary.—Resin soluble in petroleum spirit ...	5·2
" " alcohol	60·1
Soluble in water (arabin)	5·6
Metarabin	14·0
Accidental impurity	12·5
Moisture	1·7

The presence of metarabin in this exudation is remarkable, in view of the fact that pararabin is the main constituent of gums of this Natural Order. I have subjected my experiments to very careful repetition and revision. It contains no tannic acid.

The present is the first occasion in which a resin (or, to speak more correctly, a substance consisting mainly of resin) has been recorded from any Protead, so far as the author is aware, and certainly from any Australian species.

Hakea acicularis, *R. Br.*

The "plentiful" occurrence of *Hakea* gum in Western Australia has already been alluded to. In Southern New South

Wales a clear, hard, yellowish gum has been observed (May, 1888) on a shrub (*Hakea acicularis*, R. Br., B. Fl., v., 514) in small quantities.

Since the above was written Mr. R. T. Baker has been fortunate enough to discover gum on a twig of this species near the South Head Lighthouse, at Sydney. The leaves were dead, and matted together by the gum, which is most plentiful near where the wood has been destroyed by an insect. The whole branch as received at once gives the idea that the gum is a pathological product. On healthy branches of the same shrub no trace of gum could be seen. It is perfectly transparent, and of a pale amber colour, much resembling (in outward appearance) ordinary Black Wattle gum (*Acacia decurrens*). It is insipid, and when placed in water forms a smooth mucilaginous liquid, having much the consistency of tragacanth under similar circumstances (though without opalescence), and, like it, exceedingly difficult to filter. Following is an analysis:—

Soluble gum (arabin) ...	16·52
Pararabin	63·2
Moisture	19·1
Ash	1·6

HAKEA MACRAEANA, *F. v. M.*

Found in Southern New South Wales. A recently discovered species. Height, 20 to 30 feet; diameter, 4 to 14 inches. Sugar Loaf Mountain, Braidwood.

An almost colourless tasteless gum. Months after collection it is tasteless, like indiarubber, showing its retentiveness of moisture. It swells up in cold water to a great bulk, forming a gelatinous mass very similar to that yielded by Tragacanth under similar circumstances. It however retains the shape of the original pieces for a much longer period than does the latter substance. It seems scarcely to dissolve. Following is an analysis:—

Arabin	5·8
Pararabin	69·94
Moisture	22·7
Ash	1·32

A second sample has been received from Bembooka Mountain, Lyttleton, New South Wales It is a much finer specimen than the preceding, and I am able to make a more definite statement concerning it. It is from an aged tree, which has commenced to decay in the centre. It consists of large tears up to two inches long, and one inch broad, and attached to each of these large ones are a number of vermiform tears of two or three lines in

diameter. It is transparent, of hyaline or horny appearance, and from colourless up to pale amber. It reminds one irresistibly of Sterculia gum, and it is not a little interesting to find that the similarity also extends to their chemical composition. Following is an analysis:—

Arabin...	...	...	15·02
Pararabin	...	...	63·4
Moisture	...	...	21·0
Ash ...	...	...	1·4

A comparatively high percentage of arabin in a Proteaceous gum is a sign of its newness, and causes the formation of a viscid solution in water. When these gums have been exposed to the weather, more or less of the arabin is washed out, and the remaining soluble portion can be filtered off with great facility.

PERSOONIA LINEARIS, *Andr.*, B. Fl., v. 397.

"Geebung." A very dark gum has been observed (12th June, 1888) on this species. It seemed to resemble that of *Grevillea striata*, but was not sufficiently abundant to collect.

STENOCARPUS SALIGNUS, *R. Br.*, B. Fl., v. 539.

"Beef-wood," "Silky Oak," &c. Small quantities of gum have been seen on bruised trees of this species several times. The author looks upon gum as being usually a pathological product, and it is therefore most likely to be found on sickly and injured trees.

XYLOMELUM PYRIFORME, *Knight*, B. Fl., v. 408.

This is the well-known "Native Pear" of New South Wales. I am not aware that the finding of gum on this tree has been previously announced.

I found a small quantity of a yellowish-brown gum, tough, and of dull appearance, on a sapling which was six inches in diameter, but which had been cut down, leaving four feet of stump, from which there was a free growth of new leaves—a testimony also that the gum had exuded some time.

It swells up largely in cold water, and then disintegrates, forming masses of a nearly colourless jelly. I have analysed it with the following result:—

Arabin...	...	...	trace
Pararabin	...	...	79·56
Moisture	...	...	17·35
Ash ...	...	...	·55

It may, therefore, be considered to consist solely of pararabin.

Addendum.—The remarks made under *Persoonia linearis* may now be repeated, word for word, in regard to a Sydney "Honeysuckle" (*Banksia serrata*, Linn. fil). Can it be that this phenomenally wet season is the cause of the present abundance of gum on species already known to yield it, and on certain species (not confined to the Proteaceæ) on which it had not hitherto been recorded.

Notes on Certain "Pores" on the Veins of some Diptera.

By Frazer S. Crawford.

[Read Sept. 10, 1889.]

Plate IV.

There has lately been a controversy between two eminent dipterists, Dr. Williston, of the United States, and Mr. F. A. A. Skuse, of Sydney, whether the parasites of *Icerya Purchasi* and *Monophlebus Crawfordi* are identical; the affirmative view being originally promulgated by myself.

Dr. Williston had to base his opinion on specimens more or less mutilated, and without any certain knowledge of the host from which each was bred, whereas Mr. Skuse was enabled to breed the insects, and therefore to examine them to the best advantage.

Having lately had an opportunity of thoroughly re-examining the venation of the wings of these insects, I discovered that my original determination was incorrect; and I take this opportunity of corroborating Mr. Skuse's opinion that the insects are specifically distinct.

In the course of this investigation I discovered on certain veins peculiar processes, which I call "pores." These are very small bodies, circular in shape, hardly raised above the level of the vein, and apparently having an opening in the centre, but of this fact I do not feel at all sure. They are generally on the upper surface of the wing, are slightly darker in colour than the vein, and so small as to require a half inch objective to detect them. So far as my observations extend, they number from five to eight when present, and their number and position are constant in each species, and occasionally they are accompanied with a slight dilation of the vein at the spot where they appear (plate iv., fig. 2*a*).

Now on the last section of the third longitudinal vein of *Lestophonus Icerya*, Will., there are three of these pores (plate iv., fig. 1), but on the same part of *L. monophlebi*, Skuse, there are but two (figs. 2 and 2*a*). From the knowledge gained by examining other diptera, I feel confident that this apparently trifling difference is in reality a specific distinction of great importance.

Mr. Skuse has obligingly informed me that these "pores" are, he believes, homologous with what Jurine (Nouvelle methode du

classer les Hyménoptères et les Diptères; 1807) named "Bullæ," observed by him in the wings of certain hymenopterous insects. It is strange that for eighty years these "Bullæ" or "Pores" have been either ignored or forgotten by succeeding dipterists. Not having M. Jurine's work to refer to, I cannot state what are his views with regard to these "Bullæ," but judging from the name bestowed (bulla, a boss or stud), he did not think they were of the nature of pores. On the other hand Mr. Skuse suggests that they are for the purpose of aerating the blood coursing through the veins. If this be their object the term "pore" is correct. Considering that some of the families of the the Diptera do not have them, that their position is limited to certain veins, viz., the junction of the first longitudinal with the costal, the third longitudinal, and the middle transverse vein; and that in some places the pores are close together, whilst elsewhere they are relatively far apart, it really seems that if such be their object, nature was extremely capricious in arranging them and that she had neglected in this case that close adaptation of means to an end that characterises her work.

So far as my observations have extended, it would appear that the Diptera possessing large scales or hairs on their veins (*Culicidæ*, *Psychodidæ*, *Tipulidæ*) have no pores; while the *Muscidæ*, *Syrphidæ*, and *Dolichopodidæ* have them. With one exception, a *Dolichopodida*, there is always a solitary pore on the middle transverse vein, and in this case the third longitudinal is so enlarged at this spot that the pore would otherwise be situated on the mid-transverse vein (fig. 8). My observations have not as yet extended to the Hymenoptera, but judging from Mr. Skuse's remark, only certain families possess them, as in the case of the Diptera.

Now that the attention of dipterists is called to these facts it is to be hoped that before long their true nature may be satisfactorily settled, and that they may sometimes be found of value in settling doubtful cases of affinity.

EXPLANATION OF PLATE IV.

Wings of the following Families, Genera or Species of the Diptera, showing the position of the pores.

Family Oscinidæ? 1. Lestophonus Iceryæ. 2. L. monophlebi. 2*a*. Portion of the 3rd longitudinal vein showing dilation with pores. 2*b*. A pore very greatly magnified. 3. Sp.?

Family Muscidæ. 4. Musca domestica. 5. Calliphora sp.

Family Tachinidæ. 6. Tachina? sp.

Family Syrphidæ. 7. Sp.

Family Dolichopodidæ. 8. Sp. 8*a*. A portion of mid-transverse vein, being greatly enlarged.

A Revision of the Flora of Kangaroo Island and other Botanical Notes Relating thereto.

By Professor Ralph Tate, F.L.S., F.G.S., &c.

[Read December 4, 1888.]

In a "List of Plants additional to the Flora of Kangaroo Island" (Trans. Roy. Soc., S. Aust., for 1888, p. 290) are certain species recorded the correct identification of which I was disposed to challenge, and for this purpose the author of the list kindly submitted for my examination the majority of the species which formed the basis of that enumeration. After very careful study, so far as the condition of the specimens would allow, I offer the following corrections:—

Rhagodia parabolica is *Chenopodium glaucum.*
Pultenæa villifera is **P. canaliculata.*
Pultenæa prostrata is **P. involucrata.*
Acacia acinacea is *A. brachybotrya.*
Acacia brevifolia is *A. longifolia.*
Leptospermum erubescens is *L. lævigatum.*
Melaleuca ericifolia is *M. parviflora.*
Cryptandra amara is *C. hispidula.*
Spyridium pomaderroides } are *Cryptandra obovata.*
Spyridium coactilifolium }
Spyridium bifidum is **Cryptandra scabrida.*
Opercularia ovata is *O. varia.*
Vallisneria sp. is *Ruppia maritima.*
Blyxa Roxburghi is a confervoid.
Hydrilla verticillata is **Myriophyllum Muelleri.*
Aristida Behriana is *Ehrharta stipoides.*

Cassytha sp. is a variety of *C. pubescens* with warty stems, but is readily connected with the more common form on the mainland, having a smooth stem.

Tetratheca sp. is *T. ericifolia*, of which two varieties occur on Kangaroo Island—*a. var. aphylla*, which has rough leafless stems branching from the base, and large five-merous flowers; *b. var. pilosa*, which has very short, hispid, narrow-lanceolate leaves and smaller four-merous flowers.

* Species now recordea for the first time.

Calycothrix sp. is not distinct from *C. tetragona*, except by its smaller pubescent leaves.

Hakea marginata. The specimen is incomplete for specific identification, but probably indicates a species new for South Australia. So far as the material serves it would seem to have a nearer relationship to *H. corymbosa.*

Lepyrodia sp. may be a stunted form of *L. Muelleri*, but the specimen does not permit of generic location with any degree of certainty.

CORRIGENDA TO MY LIST (vol. VI. of these Transactions, p. 149 *et seq.*).

Pomaderris apetala. This was included in the Flora, with a doubt, by Bentham, the specimen being in leaf only. I have little doubt now that it may have been a luxuriant branchlet of *P. racemosa.*

Cassinia laevis. This proves to be conspecific with *Humea punctulata*, but the correct designation will be *Cassinia punctulata*, F. v. M. and Tate. It is recorded as *Humea cassinacea* in the Ardrossan list, and as *Cassinia alasia*, F. v. M., M.S., from Coonalpyn, Ninety-mile Desert.

Toxanthus perpusillus was inserted by inadvertence for *T. Muelleri.*

Festuca bromoides should be erased, not being indigenous.

LIST OF ADDITIONAL SPECIES, EXCLUDING THOSE IN THE FOREGOING LIST.

Boronia parviflora. DeMole River (*R.T.*).

Eriostemon difformis. DeMole River (*R.T.*).

Stackhousia flava. DeMole River (*R.T.*).

Asperula oligantha. ——? (*Tepper f.*). The leaves four in a whorl, and broadly ovate.

Brachycome cuneifolia. ——? (*Tepper f.*). The leaves are entire or less toothed, and the achenes sparsely hairy on the thickened wing-like margins as compared with the type.

Senecio Cunninghami. Ravine des Casoars (*Tepper f.*).

Goodenia amplexans. DeMole River (*R.T.*).

Mitrasacme distylis. ——? (*Tepper*); recorded by Baron F. von Mueller, Vict. Naturalist, 2-1889.

Epacris impressa. DeMole River (*R.T.*); S.-Western River (*Tepper f.*).

Sprengelia incarnata. South-Western River (*Tepper f.*).

Pterostylis vittata. ——? (*Tepper f.*).

Pterostylis nutans. Cape Willoughby (*Horswell*, in herb. *Tepper f.*).

Schœnus discifer. Dudley Peninsula (*R.T.*).

Lycopodium laterale. Head of Western River (*Tepper /*).
Selaginella Preissiana. Murray Lagoon and Karatta (*Tepper /*).
Ophioglossum vulgatum. Karatta (*Tepper /*).

A corrected list of the Kangaroo Island Plants is given in my Revised Census of South Australian Plants.* The number of species is 513, but I anticipate considerable augmentation when the moist shaded gullies of the wetter parts of the island shall have been thoroughly explored. This prediction is formed on the fact of the similarity of the flora with that of Port Lincoln, and that several species of the latter, which extend to Encounter Bay, have not yet been found on the island.

That the flora is a rich one is testified by the number of species; but as affording some evidence of the massing together of species in a limited area, I append a list of 118 species which were collected by me in a very hurried way, and without particular search for inconspicuous species, during an afternoon ramble on October 20 of this year in the vicinity of the DeMole River on the north-west coast.

The generalizations touching the origin and constitution of the flora, which I submitted to you five years ago, have not been materially affected by the large accessions of species gained during the interval. The number of extra-Australasian species has been increased by *Ophioglossum vulgatum* and the transference of *Erythræa australis* to *E. spicata;* but it has, on the other hand, been reduced by expurgation of *Festuca bromoides*, and the substitution of *Potamogeton Tepperi* for *P. natans* and *Epilobium glabellum* for *E. tetragonum;* the proportion of such to the whole flora is now one-tenth instead of between a seventh and an eighth. The sequence of the ordinal groups as regards numbers of species remains about the same; but the ratio of genera to species is slightly altered, the genera being 256 with 513 species, representing a ratio of one to two.

The number of peculiar species is 14; *Xanthorrhœa Tatei* is now known in the Port Lincoln district and at Mount Crawford, in the Mount Lofty Range; *Cryptandra halmaturina* also occurs at Encounter Bay, as recorded by Baron F. von Mueller (Phil. Soc., Melbourne, vol. 1855, p. 121), wherein the original diagnosis will be found. They are as follows:—Cheiranthera volubilis, *Bentham;* Bertya rotundifolia, *F. v. M.;* Cryptandra Waterhousei, *F. v. M.;* C. scabrida, *Tate;* Lhotzkya glaberrima, *F. v. M.;* L. Smeatoniana, *F. v. M.;* Melaleuca cylindrica, *R. Brown;* Pultenæa viscidula, *Tate;* Hydrocotyle crassiuscula, *Tate;* H. comocarpa, *F. v. M.;* Petrophila multisecta, *F. v. M.;*

*See post.

Achnophora Tatei, *F. v. M.*; Candollea Tepperiana, *F. v. M.*; Schœnus discifer, *Tate.*

List of Plants observed in the neighbourhood of DeMole River, Kangaroo Island.

Ranunculus parviflorus
Hibbertia stricta
" Billardieri
Cassytha pubescens
Viola hederacea
Drosera pygmæa
" auriculata
Comesperma calymega
Tetratheca ericifolia, vars. aphylla and pilosa
Thomasia petalocalyx
Lasiopetalum Schulzeni
Poranthera ericoides
" microphylla
Phyllanthus australis
Dodonæa viscosa
Oxalis corniculata
Zieria veronicea
Boronia parviflora
" filifolia
" Edwardsi
Eriostemon difformis
Correa speciosa
Claytonia calyptrata
Mesembrianthemum australe
Gompholobium minus
Daviesia brevifolia
Pultenæa daphnoides
" viscidula
Eutaxia empetrifolia
Dillwynia floribunda
Platylobium obtusangulum
Kennedya prostrata
Acacia retinodes
" myrtifolia (with phyllodia four to five inches long and a quarter wide)
Tillæa verticillaris
Loudonia Behrii
Haloragis teucrioides
Epilobium glabellum
Thryptomene ciliata
Baeckea diffusa
Leptospermum scoparium
Eucalyptus obliqua
" capitellata
" corynocalyx
" cosmophylla
" incrassata
Stackhousia flava
Cryptandra vexillifera
" Waterhousei
Pimelea ligustrina
" spathulata
" octophylla
" phylicoides
" flava
Petrophila multisecta
Isopogon ceratophyllus
Adenanthos terminalis
" sericeus
Conospermum patens
Grevillea aspera
" halmaturina
Hakea rostrata
Banksia marginata
" ornata
Choretrum glomeratum
Apium prostratum
Daucus brachiatus
Opercularia varia
Aster floribundus
Achnophora Tatei
Calocephalus Brownii
Ixodia achilleoides
Ixiolæna supina
Helichrysum obtusifolium var. tephroides
Gnaphalium japonicum
Stuartina Muelleri
Erechthites prenanthoides
Cymbonotus Lawsonianus
Candollea despecta
Wahlenbergia gracilis
Goodenia geniculata
" amplexans
Scævola aemula
Mitrasacme paradoxa
Logania ovata
Plantago varia
Utricularia dichotoma
Myosotis australis
Prostanthera spinosa
Styphelia Sonderi
" concurva
" fasciculiflora
Epacris impressa
Casuarina quadrivalvis
" distyla
Thelymitra flexuosa
Caladenia carnea
Patersonia glauca
Sisyrinchium cyaneum
Bulbine semibarbata

Thysanotus Patersonii
Xanthorrhiza Tatei
Triglochin procera
Juncus paucíflorus
" pallidus
Calastropius fastigiatus
Centrolepis aristata
" strigosa
Schœnus Tepperi

Lepidosperma filiforme
Cladium schœnoides
" filum
Caustis pentandra
Carex paniculata
Sporobolus virginicus
Pteris aquilina
Lomaria discolor
Cheilanthes tenuifolia

A Census of the Indigenous Flowering Plants and Vascular Cryptogams of Extra-Tropical South Australia.

By Professor Ralph Tate, F.L.S., F.G.S., &c.

[Read October 2, 1889].

Plate V.

Since the publication of a Census of the Native Plants of South Australia, in the volume of these Transactions for 1880, much activity has been shown in botanical research—greatly extending our knowledge of the species and their distribution, that it is deemed desirable to submit a Revised List.

To give some idea of the distribution of the constituents of the flora of extra-tropical South Australia, this part of the province is divided into the following regions and districts, as indicated on the accompanying map.

I. The Eremian Region.

This is limited by the rainfall-line of about ten inches, which dividing line on the south closely approximates to "Goyder's rainfall-line"—demarking the northern limit of successful wheat-cultivation. It comprises the "salt-bush" country of the pastoralist. About one-sixth of the species are extra-Australasian, chiefly of the Indo-Malay Province, whilst a large proportion of the endemic species belong to exotic genera.*

District F. This embraces the elevated country to the north of the Lake Eyre Basin, and drained by the tributaries of the River Finke, which have their sources in the McDonnell Range. The average annual rainfall does not exceed ten inches, but it is very irregular in its distribution.

District C. This is the most characteristic section of the Eremian Region; it is subject to severe droughts, and the rainfall does not exceed seven inches. It extends in a northerly direction, certainly as far as Charlotte Waters, is for the most part of low elevation, and comprised of Cretaceous and Tertiary clays and sands, except outlying masses of the Flinders Range which form hilly tracts of limited extent.

* See Proc. Austr. Assoc. for the Advancement of Science, 1888, p. 312.

District S. This has a slightly increased rainfall as compared with C, and is mostly comprised of elevated ground in parallel ranges of not inconsiderable height, collectively called the Flinders Range. Outlying areas of District N., far within its boundary, occur at Wilpena Pound, at Blinman, and in a modified degree about Mount Serle; the inclusion of so many southern forms in the list for this district somewhat masks the truly desert-character of its prevailing flora. For its southern limit, I use the watershed-line, demarking the northern from the southern stream-courses.

District W. This is the south-western extension of C., and presents much the same physical characters. However, in the Gawler Range, there occurs a small collection of species, which belongs to more southern latitudes; otherwise the flora is essentially Eremian.

District M.—This area in its northern parts is a southerly extension of C and S; it comprises the Murray Desert, a plain which abuts on the west against the Adelaide Chain, and its north-east extension to the Barrier Range, and is constituted of Eocene and Pliocene strata, which are highly absorbent to water. Its south-western and southern limits, as defined by geological and topographical features, reach beyond the rainfall line of ten inches; and it becomes a question where best to fix the boundary, though on the whole there is an abrupt change in the flora wherever we pass from the Archæan to the Eocene rocks. The terrestrial flora is largely comprised of Eremian species, but the fluviatile and paludinal species are essentially Euronotian.

II. The Euronotian Region.

The flora of this region is of the type dominant in the wetter parts of temperate Australia, except the extreme south-west. It is essentially an aboriginal flora, being largely composed of endemic genera and species.

District A. Herein is presented one of the chief subtypes of the Euronotian flora, or at least such of it as occurs on the higher elevations of the Adelaide chain; the plants of the plains are more widely distributed throughout the Euronotian region of Australia.

District N. This comprises the country to the north of a line from the head of St. Vincent Gulf to the Burra. The elevated country about Wirrabirra and Mount Remarkable, with its relatively high rainfall, forms a small botanical outlier of the Adelaide chain.

District Y. The flora of Northern Yorke Peninsula is an extension of that of N; that of the southern part is not known, but we may anticipate certain affinities with L and K.

District L. Comprises Southern Eyre Peninsula, or the Port Lincoln district, and the costal tract extending to about Fowler Bay. The flora is essentially Euronotian, but the absence of certain characteristic species of A, and the presence of identical or closely-allied species of the Swan River district, impart a distinctinctive feature.

District K. The flora of Kangaroo Island is largely comprised of species proper to A and L, whilst it contains also species of Autochthonian origin which have here their eastern limit, and others of Victorian and Tasmanian origin which here reach their westernmost limit; it moreover contains several restricted species and one genus.

District T. Comprises the country south of M and east of Lake Alexandrina, and includes the Ninety-mile Desert and the Tatiara. It is largely constituted of Pliocene and Pleistocene sands and clays, occupying a low-lying region subject to inundation, and largely interspersed with marshes. In its south-east direction it is bounded by the low plateau of Eocene-limestones constituting the Mount Gambier district.

This district has not been botanically explored in any systematic manner; its species for the most part are Adelaidean, but towards the Victorian frontier it has received a few species which are restricted to the southern parts of the Wimmera-country.

District G. The extreme south-east corner of this colony is well defined both geologically and meteorologically. Physically it is an elevated plain comprised of Eocene-limestones, on which are reared cones of volcanic debris to heights of about 700 feet. The rainfall exceeds 25 inches within a line drawn from Guichen Bay to about Penola, though the limestone plateau continues northward beyond Narracoorte; within this area, thus roughly defined, many species characteristic of Southern Victoria and even of Tasmania have their most western limits, the most notable of which is the Sambucus, whilst the bulk of the species occurs in district A. None of its species are restricted.

RANUNCULACEAE.

Clematis, Linne (1737).

aristata, *R. Brown*	...	...	...	...	...	...	...	...	...	G
microphylla, *DeCandolle*	...	...	S	.	M	A	N	Y	L	K	T	G

Ranunculus, Linne (1737).

aquatilis, *Linne*	...	...	...	S	.	M	A	.	.	L	.	T	G
lappaceus, *Smith*	...	...	...	S	.	.	A	N	.	L	.	T	G
rivularis, *Banks & Solander*			...	.		M	A	N	.	.	K	T	G
parviflorus, *Linne*	...	...	C	S	W	M	A	N	Y	L	K	T	G

Myosurus, Linne.

minimus, *Linne*	...	...	...	S	.	M	.	.	.	.	.	.	T

DILLENIACEAE.

Hibbertia, Andrews (1800).

hirsuta, *Bentham*	...	...	...	...	...	A						
sericea, *Bentham*	...	...	...	...	...	A	.	.	L	K	T	G
stricta, *R. Brown*	...	...	...	...	M	A	N	Y	L	K	T	G
Billardieri, *F. v. Mueller*	...	...	...	...	A	.	.	.	K			G
acicularis, *F. v. Mueller*	...	...	...	...	A	.	.	.	.	.		G
virgata, *R. Brown*	...	...	...	W	M	A	.	Y	.	K	.	.
fasciculata, *R. Brown*	...	...	...	...	...	A	.	.	L	K	T	G
glaberrima, *F. v. Mueller*	...	F										

LAURACEAE.

Cassytha, Osbeck (1753).

glabella, *R. Brown*	...	...	...	...	...	A	.	Y	L	K	.	G
pubescens, *R. Brown*	...	...	...	...	M	A	.	Y	L	K	.	G
melantha, *R. Brown*	...	...	...	W	M	A	.	Y	L	K	T	G

CERATOPHYLLEAE.

Ceratophyllum, Linne (1735).

demersum, *Linne*	...	...	...	...	M

PAPAVERACEAE.

Papaver, Linne.

aculeatum, *Thunberg*	...	...	...	...	M	A	N	Y	L	K	.	.

CAPPARIDAE.

Cleome, Linne.

viscosa, *Linne*	...	...	...	F

Capparis, Linne.

lasiantha, *R. Brown*	...	...	C					
spinosa, *Linne*	...	...	F					
Mitchelli, *Lindley*	...	...	F	C	S	.	M	

CRUCIFERAE.

Nasturtium, R. Brown (1812).

terrestre, *R. Brown*	...	...	...	...	M	A					T	G

Cardamine, Linne.

eustylis, *F. v. Mueller*	...	...	...	...	M							
laciniata, *F. v. Mueller*	...	...	...	...	M	A	.	Y			T	G
flexuosa, *Withering*	...	...	...	...	...	A	N					G

Barbarea, Beckmann (1801).

vulgaris, *R. Brown*	...	...	...	...	... A

. . . . . .

Erysimum, Linne.

curvipes, *F. v. Mueller*...	...	...	S	W	M	.	N						
brevipes, *F. v. Mueller*...	...	C	S	W	M	.	N	Y					
lasiocarpum, *F. v. Mueller*	...	F C	.	.	M	.	.	Y			T	.	
Blennodia, *F. v. Mueller*	...	F C	S	W									

Sisymbrium, Linne.

filifolium, *F. v. Mueller*	...	...	S	W		.	N						
trisectum *F. v. Mueller*	...	F C	S	W	M								
nasturtioides, *F. v. Mueller*	...	...	S	W	M	.	N						
procumbens, *Tate* ...	...	...	S										
Richardsii, *F. v. Mueller*	...	...		W									
cardaminoides, *F. v. Mueller* ...		C			M						T	G	

Cakile, Linne.

maritima *Scopoli*	...	...	...	...	...	...	...	K					

Stenopetalum, R. Brown (1821).

velutinum, *F. v. Mueller*	...	F C	.	.	M								
lineare, *R. Brown* ...	...	F	.	S	.	M	A	N	Y	L	.	.	G
nutans, *F. v. Mueller* ...	...	F C											
sphaerocarpum, *F. v. Mueller*...		...	...		...	A	N	Y			T		
trisectum, *Tate*	...	C											

Geococcus, Drummond & Harvey (1855).

pusillus, *Drummond & Harvey*	...		W	M			Y						

Alyssum, Linne.

minimum, *Pallas*	...	...	...	S	W	M	.	N	Y				

Menkea, Lehmann (1843).

australis, *Lehmann*	...	...	...	...	M								
sphaerocarpa, *F. v. Mueller*	...	F											

Capsella, Moench (1792).

pilosula, *F. v. Mueller* ...	...	...		W	M			Y					
elliptica, *F. v. Mueller*...	...	...	S	W	M	A	N	Y	L	K	T	G	
humistrata, *F. v. Mueller*	...	...	...		M								
cochlearina, *F. v. Mueller*	...	...	S	W			N						
Drummondi, *F. v. Mueller*	...	...		W									

Lepidium, Linne.

strongylophyllum, *F. v. Mueller*	F												
leptopetalum, *F. v. Mueller* ...	...	...	S		M								
rotundum, *DeCandolle* ...	...	F C											
phlebopetalum, *F. v. Mueller*...	F	C	S		M								
monoplocoides, *F. v. Mueller* ...		C			M			Y					
papillosum, *F. v. Mueller*	...	F C	S	W	M		N						
ruderale, *Linne*	...	F C	S	.	M	A	N	Y	.	K	T	G	
foliosum, *Desvaux* ...	...	...	...	...	...		...		...	K	T		

VIOLACEAE.

Viola, Linne.

hederacea, *Labillardiere*	...	...	...	...	A					K		G	
betonicifolia, *Smith* ...	...	...	...	...	A							G	

Hybanthus, Jacquin (1763).

floribundus, *F. v. Mueller* ... ... W A T G
enneaspermus, *F. v. Mueller* ... F
Tatei, *F. v. Mueller* ... ... S

Hymenanthera, R. Brown (1818).

Banksii, *F. v. Mueller* ... ... A

DROSERACEAE.

Drosera, Linne (1737).

binata, *Labillardiere* ... ... A . . . . . G
glanduligera, *Lehm.* ... ... A Y L K T G
Whittakerii, *Planchon*... ... ... A Y . K T G
pygmaea, *DeCandolle* ... ... A L K T G
spathulata, *Labillardiere* ... ... G
Burmanni, *Vahl*... ... ... F
Indica, *Linne* ... ... F
Menziesii, *R. Brown* ... ... C A N Y L K . G
auriculata, *Backhouse* ... ... S A N K . G
peltata, *Smith* ... ... A N . L T G

FRANKENIACEAE.

Frankenia, Linne.

laevis, *Linne* ... ... F C S W M A N Y L K T G

PITTOSPOREAE.

Pittosporum, Banks (1788).

phillyraeoides, *DeCandolle* ... F C S W M A N Y L K T G

Bursaria, Cavanilles (1797).

spinosa, *Cavanilles* ... . S . M A N Y L K T G

Marianthus, Huegel (1837).

bignoniaceus, *F. v. Mueller* ... ... A K

Billardiera, Smith (1793).

scandens, *Smith*... ... ... L K G
cymosa, *F. v. Mueller* ... ... A N Y L K T G

Cheiranthera, Cunningham (1829).

linearis, *Cunningham* ... ... A N Y L K
volubilis, *F. v. Mueller* ... ... K

POLYGALEAE.

Polygala, Linne.

Chinensis, *Linne* ... ... F

Comesperma, Labillardiere (1806).

scoparium, *Steetz* ...	...	...		W	M					L				
volubile, *Labillardiere*...	...	...		...	...	A			Y	L	K	.	G	
sylvestre, *Lindley* ...	...	F	.	S										
viscidulum, *F. v. Mueller*	...	F												
calymega. *Labillardiere*	...	...		...	...	A				L	K	T	G	
polygaloides, *F. v. Mueller*	...	...		...	...	A				L	K	T	G	

ELATINEAE.

Elatine, Linne (1737).

Americana, *Arnott* ...	...	...	S		M									G

Bergia, Linne (1771).

ammannioides, *Roxburgh*	...	C			M									
perennis, *F. v. Mueller*	...	F												

HYPERICINEAE.

Hypericum, Linne.

Japonicum, *Thunberg* ...	...	F	C			A	N	.	.	K	T	G		

RUTACEAE.

Correa, Smith (1798).

semula, *F. v. Mueller* ...	...	...	...	...	A					K		G		
alba, *Andrews*	...	...	...	...	A					K		G		
speciosa, *Andrews* ...	...	...	W	.	A	N	Y	L	K	T	G			
decumbens, *F. v. Mueller*	...	...	...	...	A				K					

Zieria, Smith (1798).

veronicea, *F. v. Mueller*	...	...	...	...	A				K					

Boronia, Smith (1798)

Edwardsi, *Bentham* ...	...	...	...	...	A				K					
coerulescens, *F. v. Muller*	...	...	W		A	N		L	K	T	G			
filifolia, *F. v. Mueller* ...	...	...	...	...	A				K	T	G			
clavellifolia, *F. v. Mueller*	...	...	W	.			Y		.	T				
parviflora, *Smith* ...	...	...	...	...	A				K					
polygalifolia, *Smith* ...	...	...	...	...	A						G			
pinnata, *Smith*	...	...	...	...	...	...		...		T	G			

Eriostemon, Smith (1798).

obovalis, *Cunningham* ...	...	...	...	...	...	...		...		T				
linearis, *Cunningham* ...	...	...	W											
difformis, *Cunningham*...	...	...	W	M	A			L	K	T				
lepidotus, *Sprengel* ...	...	...	...	.	.		.	.	.	T				
stenophyllus, *F. v. Mueller*	...	...	...	...		...		...		T				
sedifiorus, *F. v. Mueller*	...	...	W	M		N	Y			T				
pungens, *Lindley* ...	...	...	...	...	A			L		T				
Hillebrandi, *F. v. Mueller*	...	...	...	...	A									
brachyphyllus, *F. v. Mueller* ...	...	...	...	...	A			L						
capitatus, *F. v. Mueller*	...	...	W			N	Y	L	K					

Geijera, Schott (1834).

salicifolia, *Schott*	...	...	...	...	M								
parviflora, *Lindley*	...	...	...	S	W	M	·	N	Y	L	K		

MELIACEAE.

Owenia, F. v. Mueller (1857).

acidula, *F. v. Mueller*	...	...	F

LINEAE.

Linum, Linne.

marginale, *Cunningham*	...	...	...	M	A	N	Y	L		T	G		

ZYGOPHYLLEAE.

Tribulus, Linne (1735).

terrestris, *Linne*	...	...	F	C	S	W	M					T	
hystrix, *R. Brown*	...	...	F	C									
macrocarpus, *F. v. Mueller*	...		F										
Forrestii, *F. v. Mueller*	...		F										
platypterus, *Bentham*	...	...	F										
hirsutus, *Bentham*	...	...	F										
astrocarpus, *F. v. Mueller*	...		F										

Zygophyllum, Linne (1735).

apiculatum, *F. v. Mueller*	...	F		S	W	M		N					
fruticulosum, *DeCandolle*	...	F	C	S	W	M	.	N	Y				
ammophilum, *F. v. Mueller*	...	F	C		W	M			Y	L	K	T	
Billardieri, *De Candolle*	...		C	S	W	M	A	?	Y	L	K	T	G
prismatothecum, *F. v Mueller*			...	S									
Howittii, *F. v. Mueller*	...		C	S									
glaucescens, *F. v. Mueller*	...		C		W	M	A	N	Y	L			
crenatum, *F. v. Mueller*	...		...		W	M		N	Y				
iodocarpum, *F. v. Mueller*	...	F	C	S	W	M							

Nitraria, Linne (1759).

Schoeberi, *Linne*	...	...	C	S	W	M	A	N	Y	L	K	T	

GERANIACEAE.

Pelargonium, L'Heritier (1787).

australe, *Willdenow*	...	...	...	S			A	N	Y	L	K	T	G
Rodneyanum, *Mitchell*	...	...	...	...		...	A					T	G

Geranium, Linne.

pilosum, *Solander*	...	...	...	S	W	M	A	N	Y	L	K	T	G

Erodium, L'Heritier (1787).

cygnorum, *Nees*	...	...	F	C	S	W	M	A	N	Y	L	K	T	G

Oxalis, Linne (1737).

corniculata, *Linne*	...	...	F	.	S	W	M	A	N	Y	L	K	T	G

SAPINDACEAE.

Diplopeltis, Endlicher (1837).

Stuartii, *F. v. Mueller* ... ... F

Atalaya, Blume (1847).

hemiglauca, *F. v. Mueller* ... F C

Heterodendron, Desfontaines (1818).

oleaefolium, *Desfontaines* ... F C S W M . N Y

Dodonaea, Linne (1737).

viscosa, *Linne*	...	F	C	S	W	M	A	N	Y	L	K	T	G
petiolaris, *F. v. Mueller*	...	F											
lanceolata, *F. v. Mueller*	...	F											
procumbens, *F. v. Mueller*	...		...		...		...		...		...		G
lobulata, *F. v. Mueller* ...	...		...	S	W	M		N					
bursarifolia, *Behr & F. v. M.*...			...		...	M	A		Y		K		
Baueri, *Endlicher* ...	...		...		...	M		N	Y	L	K		G
hexandra, *F. v. Mueller*	...		...		...		...A		Y	L			
humilis, *Endlicher* ...	...		...		W				Y	L	K	T	
boronifolia, *G. Don* ...	...		...		...	...		...	Y				
macrozyga, *F. v. Mueller*	...	F											
tenuifolia, *Lindley* ...	...		...	S									
stenozyga, *F. v. Mueller*	...		...		W				Y			T	
microzyga, *F. v. Mueller*	...	F	C	S	W			N					

STACKHOUSIEAE.

Stackhousia, Smith (1798).

megaloptera, *F. v. Mueller*	...		...	F									
spathulata, *Sieber* ...	...		...		...	...		...		...	K		G
linarifolia, *Cunningham*	...		...		...	M	A	N	Y	L	K	T	G
flava, *Hooker*	...		...		...		A		Y	L	K		
muricata, *Lindley* ...	...	F											
viminea, *Smith*	...	F											

Macgregoria, F. v. Mueller (1873).

racemigera, *F. v. Mueller* ... F

PHYTOLACCEAE.

Didymotheca, J. Hooker (1847).

thesioides, *Hooker* ...	...	...	...	...	...	...	Y	L	K	.	G
pleiococca, *F. v. Mueller*	...	F			M	A			K	T	G

Gyrostemon, Desfontaines (1820).

ramulosus, *Desfontaines* ... F W

Codonocarpus, Cunningham (1830).

pyramidalis, *F. v. Mueller*	...			S			
cotinifolius, *F. v. Mueller*	...	F	C		M		N

MALVACEAE.

Plagianthus, R. & G. Forster (1776).

Berthae, *F. v. Mueller*... ...	...	...	...	.....	...	Y								
spicatus *Bentham*	...	...	...	M		Y		K	T	G				
glomeratus, *Bentham*	F	C	S	W		Y	L							
microphyllus, *F. v. Mueller* ...	...	...	...	...	A	N	.	L	.	T	G			

Sida, Linne (1737).

corugata, *Lindley*	F	C	S	W	M	A	N	Y						
intricata, *F. v. Mueller* ...		C					N							
virgata, *Hooker*	F	C	S	W										
cardiophylla, *F. v. Mueller* ...	F													
cryphiopetala, *F. v. Mueller* ...	F													
petrophila, *F. v Mueller* ...	F	C	S	W			N							
calyxhymenia, *J. Gay*		...		W										
rhombifolia, *Linne*	F													
inclusa, *Bentham*	F	C												
platycalyx, *F. v. Mueller* ...	F													
lepida, *F. v Mueller*	F													

Howittia, F. v. Mueller (1855).

trilocularis, *F. v. Mueller* ...	...	...	...	...	...	...	T							

Abutilon, Gaertner (1791).

tubulosum, *Hooker*	F													
leucopetalum, *F. v. Mueller* ...		C												
Mitchelli, *Bentham*	F		S											
cryptopetalum, *F. v. Mueller* ...	F													
otocarpum, *F v. Mueller* ...	F	C			M									
Avicennae, *Gaertner*		C			M									
oxycarpum, *F. v. Maeller* ...		C												
Fraseri, *Hooker*	F	C	S											
halophilum, *F. v. Mueller* ...		C	S											
macrum, *F. v. Mueller*	F			W										

Lavatera, Linne.

plebeia, *Sims*	F	C	S	W	M	A	N	Y	L	K	T	G		

Malvastrum, Asa Gray (1849).

spicatum, *A. Gray*	F	C	S	W										

Hibiscus, Linne (1735).

trionum, Linne		C												
brachysiphonius, *F. v. Mueller*		C												
microchlaenus, *F. v. Mueller* ...	F	.	.	W										
Pinonianus, *Gaudichd.*... ...	F	C												
Krichauffii, *F. v. Mueller* ...		C	S	W	M									
Sturtii, *Hooker*	F	C												
Farragei, *F. v. Mueller*... ...	F			W										
Wrayae, *Lindley*		...		W			N	Y	L					
hakeaefolius, *Giord.*		...	S	W					L					

Gossypium, Linne (1737).

australe, *F. v. Mueller*	F													
Sturtii, *F. v. Mueller*	F	C	S											

TILIACEAE.

Triumfetta, Linne.

Winneckeana, *F. v. Mueller* ... F

Corchorus, Linne.

sidoides, *F. v. Mueller* ... ... F
Elderi, *F. v. Mueller* ... ... F

STERCULIACEAE.

Hermannia, Linne.

Gilesii, *F. v. Mueller* ... ... F

Waltheria, Linne (1737).

Indica, *Linne* ... ... F

Melhania, Forskael (1775).

incana, *Heyne* ... ... F

Commergonia, R. & G. Foster (1776).

magniflora, *F. v. Mueller* ... F
loxophylla, *F. v. Mueller* ... F
Kempeana, *F. v. Mueller* ... F
Tatei, *F. v. Mueller* L

Brachychiton,, Schott & Endlicher (1832).

Gregorii, *F. v. Mueller* ... ... F

Seringia, Sprengel (1818).

corollata, *Steetz* ... ... F
nephrosperma, *F. v. Mueller* ... F
integrifolia, *F. v. Mueller* ... F

Hannafordia, F. v. Mueller (1860).

Bissillii, *F. v. Mueller* ... ... F

Thomasia, J. Gay (1821).

petalocalyx, *F. v. Mueller* ... ... A . Y L K T

Lasiopetalum, Smith (1798).

discolor, *Hooker* ... ... W A Y L K G
Behrii, *F. v. Mueller* ... ... M A N Y L K
Baueri, *Steetz* ... ... W . A . Y L K T
Tepperi, *F. v. Mueller* ... ... Y
Schulzenii, *F. v. Mueller* ... ... L K T G

TREMANDREAE.

Tetratheca, Smith (1793).

ciliata, *Lindley* ... ... G
ericifolia, *Smith* ... ... A K G

Scleranthus, *Linne* (1737).

pungens, *R. Brown*	...	...	...		W	M	A	N	.	L	.	T				
diander, *R. Brown*	...	...	...	...		...		...		...		...	G			

POLYGONACEAE.

Rumex, Linne (1737).

Brownii, *Campdera*	...	...	...	...		...	A		Y	L	K		G			
flexuosus, *Solander*	...	...	...	...		M	A									
crystallinus, *Lange*	...	...	F	C			M									
bidens, *R. Brown*	...	...	...		...	M	A						G			

Polygonum, Linne.

plebeium, *R. Brown*	...	...	F	C			M	A				T				
prostratum, *R. Brown*	...	...	...		...		M	.	N				G			
lapathifolium, *Linne*	...	...	...		...		...		...		...		...	G		
hydropiper, *Linne*	...	...	...		...		...		...		...		...	G		
minus, *Hudson*	...	...	...		S		M	A	.				G			
attenuatum, *R. Brown*	...	...	C													

Muehlenbeckia, Meissner (1840).

adpressa, *Meissner*	...	...	...		W	.	A	.	Y	L	K	.	G			
Cunninghamii, *F. v. Mueller*	...	F	C	S		M	A			L		T				
polygonoides, *F. v. Mueller*	...	...	...			M										

CHENOPODIACEAE.

Atriplex, Linne.

stipitatum, *Bentham*	...	...	...	S	W	M										
paludosum, *R. Brown*	...	...	...		W	.	A	N	Y	L	K					
mummularium, *Lindley*	...	F	C	S	W	M										
cinereum, *Poiret*	...	...	...		...	M	A	N	Y	L	K	T	G			
vesicarium, *Heward*	...	F	C	S	W	M	.	N								
rhagodioides, *F. v. Mueller*	...		C	S	.	M										
incrassatum, *F. v. Mueller*	...		C													
velutinellum, *F. v. Mueller*	...	F	C	S	W	M										
fissivalve, *F. v. Mueller*	...		C	S	W											
Quinii, *F. v. Mueller*	...	...	C	S												
angulatum, *Bentham*	...	...	C	S	.	M										
semibaccatum, *R. Brown*	...	...	...		...	M	A									
Muelleri, *Bentham*	...	F	.	S		M			Y							
prostratum, *R. Brown*	...	...	...	S		M	.	N	Y	L	K					
leptocarpum, *F. v. Mueller*	...	F	C	S		M										
limbatum, *Bentham*	...	F		S		M										
crystallinum, *Hooker*	...	...	...		...		...		...		...		...	G		
halimoides, *Lindley*	...	...	C	S	W	M										
holocarpum, *F. v. Mueller*	...	F	C	S	W	M										

Dysphania, R. Brown (1810).

plantaginella, *F. v. Mueller*	...	F	.	.	W											
simulans, *F. v. Mueller & Tate*	...	F	C													
litoralis, *R. Brown*	...	...	C	S	.	M			.							

Rhagodia, R. Brown (1810).

Billardieri, *R. Brown* ...	...	...	...		M	A	.	Y	L		T	G
parabolica, *R. Brown* ...	...	...	S		M	A	N	Y			T	
Gaudichaudiana, *Moquin*	...	...		W	M							
crassifolia, *R. Brown* ...	...	C		W	M			Y	L	K	T	
Preissii, *Moquin* ...	...	...		W	.			Y				
spinescens, *R. Brown* ...	...	F	C	S	W	M			Y					
nutans, *R. Brown* ...	...	F	C	S	.	M	A		Y	L	K	T	

Chenopodium, Linne.

nitrariaceum, *F. v. Mueller* ...	...	S	W	M	A	.	Y					
auricomum, *Lindley* ...	...	F	C	S	.	M								
microphyllum, *F. v. Mueller* ...	...	...		M	A	N	Y	L				
rhadinostachyum, *F. v. Mueller*	F											
carinatum, *R. Brown* ...	...	F	C	S	W	M	A	N	Y	.	K	.	G
cristatum, *F. v Mueller*	...	C	S	W	M	.	N					
atriplicinum, *F. v. Mueller*	...	...	S		M							

Enchylaena, R. Brown (1810).

tomentosa, *R. Brown* ...	...	F	C	S	W	M	A	N	Y	L	K	.	G

Threlkeldia, R. Brown (1810).

diffusa, *R. Brown* ...	...	...	...	...	A				K				

Kochia, Roth (1799).

fimbriolata, *F. v. Mueller* ...	...	S	W										
lanosa, *Lindley*	...	F	C	S	W	M								
lobiflora, *F. v. Mueller* ...	...	...	S	W									
oppositifolia, *R. Brown*	...	...		W	.	A	N	Y	L	K	T	
brevifolia, *R. Brown* ...	...	F	.	S	W	M	A	N	Y	L				
triptera, *Bentham* ...	...	F	C	S		M								
decaptera, *F. v. Mueller*	...	...		W									
pentatropis, *Tate* ...	...	...	S										
pyramidata, *Bentham* ...	...	F		S		M								
eriantha, *F. v. Mueller*...	...	F	C	S	W	.		N						
spongiocarpa, *F. v. Mueller*	...	F												
villosa, *Lindley*	...	F	C	S	W	M	A		Y			T	
sedifolia, *F. v. Mueller*...	...		C	S	W	M								
aphylla, *R. Brown* ...	...	F	C	S	W	M	A							
humillima, *F. v. Mueller*	...	...		...		M			Y				
ciliata, *F. v. Mueller* ...	...		C	S	W	M								
brachyptera, *F. v. Mueller*	...		C	S	.	M	.	N						
stelligera, *F. v. Mueller*	...	...		...		M								

Bassia, Allioni (1766).

salsuginosa. *F. v. Mueller*	...	...		...		M		N						
enchylaenoides, *F. v. Mueller*...	...		...		.	A	N	Y						
Dallachyana, *Bentham* ...	...	...	S		M									
tricornis, *Bentham* ...	...	...	S	.	M									
biflora, *F. v. Mueller* ...	...	...	S	.	M	A	N		L					
paradoxa, *F. v. Mueller*	...	F	.	S	W	M		N						
lanicuspis, *F. v. Mueller*	...	F	C	S	W									
diacantha, *F. v. Mueller*	...	F	C	S	W	M	A	N	Y	L				
uniflora, *F. v. Mueller* ...	...		C	S	W									
bicornis, *F. v. Mueller* ...	...	F	C	S										

eriochiton, *Tate*...	F	.	S	W	M									
Cornishiana, *F. v. Mueller* ...		C												
quinquecuspis, *F. v. Mueller* ...	F	C	S	.	M									
echinopsila, *F. v. Mueller* ...		...	S	.	M									
divaricata, *F. v. Mueller* ...		C	S	W	M									
bicuspis, *F. v. Mueller*		C	S											

Babbagia, F. v. Mueller (1858).

dipterocarpa, *F. v. Mueller* ...	F	C	S											
acroptera, *F. v. Mueller & Tate*		C	S											
pentaptera, *F. v. Mueller & Tate*		.	S											

Salicornia, Linne.

robusta, *F. v. Mueller*		...		...	M									
arbuscula, *R. Brown*		C	S	W	M	A	N	Y	L	K	T	G		
australis, *Solander*		C	S	W	.	A	.	Y	L	K	T	G		
tenuis, *Bentham*...		...	S											
leiostachya, *Bentham*	F	C												

Salsola, Linne (1737).

Kali, *Linne*	F	C	S	W	M	A	N	Y	L	.	T	G		

Suaeda, Forskael (1779).

maritima, *Dumortier*					M	A	.	Y	L	K	.	G		

AMARANTACEAE.

Euxolus, Rafinesque (1836).

Mitchelli, *F. v. Mueller* ...	F	C	S		M									

Polycnemon, Linne (1742).

pentandrum, *F. v. Mueller* ...						A				K	T	G		
diandrum, *F. v. Mueller* ...		C		W					L					
mesembrianthemum, *F. v. M.*		C												

Ptilotus, R. Brown (1810).

obovatus, *F. v. Mueller* ...	F	C	S	W	M	.	N							
incanus, *Poiret*	F	C	S											
exaltatus, *Nees*		C	S	W										
Beckeri, *F. v. Mueller*		...		...	...		...		L	K				
gomphrenoides, *Moquin* ...		...		...	...		...		L					
helipteroides, *F. v. Mueller* ...	F	.												
erubescens, *Schlechtendal* ...		...		...	M	A	N				T			
alopecuroideus, *F. v. Mueller* ...	F	C	S	W	M	A								
nobilis, *F. v. Mueller*	F	.	S		M	A	N							
macrocephalus, *Poiret*		...		...	...		...		...		T	G		
spathulatus, *Poiret*		...		W	M	A	N	Y	L	.	T	G		
hemisteirus, *F. v. Mueller* ...	F			W										
Schwartzii, *F. v. Mueller* ...	F													
leucocoma, *Moquin*	F	C												
parvifolius, *F. v. Mueller* ...		C												
Hoodii, *F. v. Mueller*	F													
Murrayi, *F. v. Mueller*... ...		C												
latifolius, *R. Brown*	F	C												

Achyranthes, Linne (1737).

aspera, *Linne* ... ... F

Alternanthera, Forskael (1775).

triandra, *Lamarck* ... ... F C S M A K G
nana, *R. Brown* ... ... F

Gomphrena, Linne (1737).

Brownii, *Moquin* ... ... F

PLUMBAGINEAE.

Plumbago, Linne.

Zeylanica, *Linne* ... ... F

NYCTAGINEAE.

Boerhaavia, Linne.

diffusa, *Linne* ... ... F C S W M A N
repanda, *Willdenow* ... ... C S

URTICACEAE.

Trema, Loureiro.

cannabina, *Loureiro* ... ... F

Ficus, Linne.

platypoda, *Cunningham* ... F
orbicularis, *Cunningham* ... F

Parietaria, Linne.

debilis, *G. Forster* ... ... F C S W M A N Y L K T G

Urtica, Linne.

incisa, *Poiret* ... ... M A K G

CASUARINEAE.

Casuarina, Linne (1737).

quadrivalvis, *Labillardiere* ... ... S W A Y L K T G
glauca, *Sieber* ... ... S M
lepidophloia, *F. v. Mueller* ... ... M
suberosa, *Otto & Dietrich* ... ... T
bicuspidata, *Bentham* L
Decaisneana, *F. v. Mueller* ... F
humilis, *Otto & Dietrich* ... ... W
distyla, *Ventenat* ... ... S A N Y L K T G

LEGUMINOSAE.

Brachysema, R. Brown (1811).

Chambersii, *F. v. Mueller* ... F

Isotropis, Bentham (1837).

atropurpurea, *F. v. Mueller* ... F
Wheeleri, *F. v. Mueller* ... F C
Winneckei, *F. v. Mueller* ... F

Gompholobium, Smith (1798).

minus, *Smith* ... ... A . . L K T G

Burtonia, R. Brown (1811).

polyzyga, *Bentham* ... ... F

Mirbelia, Smith (1805).

oxyclada, *F. v. Mueller* ... F

Sphaerolobium, Smith (1805).

vimineum, *Smith* ... ... A T G

Viminaria, Smith (1804).

denudata, *Smith* ... ... A N T G

Daviesia, Smith (1798).

arthropoda, *F. v. Mueller* ... F
corymbosa, *Smith* ... ... A K
horrida, *Meissner* ... ... N
pectinata, *Lindley* L
ulcina, *Smith* ... ... S A N T G
genistifolia, *Cunningham* ... ... N Y L K T
incrassata, *Smith* ... ... A L K
brevifolia, *Lindley* ... ... A L K T G

Aotus, Smith (1805).

villosa, *Smith* ... ... G

Phyllota, DeCandolle (1825).

pleurandroides, *F. v. Mueller*... ... ... A . K G
Sturtii, *Bentham* ... ... F

Eutaxia, R. Brown (1811).

empetrifolia, *Schlechtendal* ... ... M A N Y L K T G

Dillwynia, Smith (1805).

hispida, *Lindley* ... ... A L G
ericifolia, *Smith*... ... ... A T G
floribunda, *Smith* ... ... A K G
cinerascens, *R. Brown* ... ... G
patula, *F. v. Mueller* ... ... L T

Gastrolobium, R. Brown (1811).

elachistum, *F. v. Mueller* ... ... W
grandiflorum, *F. v. Mueller* ... F

Pultenaea, Smith (1793).

daphnoides, *Wendland*... ... ... A K
stricta, *Sims* ... ... G
mucronata, *F. v. Mueller* ... ... A
scabra, *R. Brown* ... ... K
mollis, *Lindley* L

rigida, *R. Brown*									L	K		
acerosa, *R. Brown*						A			L	K		
vestita, *R. Brown*									L		T	
canaliculata, *F. v. Mueller*						A			L	K		
largiflorens, *F. v. Mueller*						A						
laxiflora, *Bentham*						A						
prostrata, *Bentham*											T	
involucrata, *Bentham*						A				K		G
pedunculata, *Hooker*						A			L			
humilis, *Bentham*												G
graveolens, *Tate*						A						
tenuifolia, *R. Brown*						?		Y	?	K		G
densifolia, *F. v. Mueller*						A			L		T	
villifera, *Sieber*						A			L			
viscidula, *Tate*										K		

Platylobium, Smith (1794).

obtusangulum, *Hooker*						A				K		G
triangulare, *R. Brown*												G

Bossiaea, Ventenat (1800).

prostrata, *R. Brown*						A						G
cinerea, *R. Brown*												G
riparia, *Cunningham*									L			
Battii, *Tate*				W								
Walkeri, *F. v. Mueller*				W								

Templetonia, R. Brown (1812).

retusa, *R. Brown*			S	W			N		L	K		
Muelleri, *Bentham*												G
aculeata, *Bentham*			S									
egena, *Bentham*	F		S	W	M							
sulcata, *Bentham*					M			Y				

Hovea, R. Brown (1812).

longifolia, *R. Brown*							N				T	
heterophylla, *Cunningham*											T	G

Nematophyllum, F. v. Mueller (1857).

Hookeri, *F. v. Mueller*	F											

Goodia, Salisbury (1806).

lotifolia, *Salisbury*						A						G
medicaginea, *F. v. Mueller*				W		A	N	Y	L	K	.	G

Ptychosema, Bentham (1839).

anomalum, *F. v. Mueller*	F											
trifoliolatum, *F. v. Mueller*		C										

Crotalaria, Linne.

linifolia, *Linne*	F											
Mitchelli, *Bentham*	F	C										
Cunninghamii, *R. Brown*	F	C										
dissitiflora, *Bentham*	F	C	S									
medicaginea, *Lamarck*	F											
incana, *Linne*	F											

Æschynomene, Linne (1737).

Indica, *Linne* ... ... F C

Glycyrrhiza, Linne.

psoraleoides, *Bentham* ... ... M

Indigofera, Linne.

linifolia, *Retzius* ... ... F
monophylla, *DeCandolle* ... F
enneaphylla, *Linne* ... ... F
viscosa, *Lamarck* ... ... F C
hirsuta, *Linne* ... ... F C
australis, *Willdenow* ... ... F A N G
brevidens, *Bentham* ... ... F C
coronillifolia, *Cunningham* ... F

Tephrosia, Persoon (1807).

purpurea, *Persoon* ... ... F
sphaerospora, *F. v. Mueller* ... F

Sesbania, Persoon (1807).

aculeata, *Persoon* ... ... F C M

Clianthus, Banks & Solander (1832).

Dampieri, *Cunningham* ... C S W

Swainsonia, Salisbury (1806).

Greyana, *Lindley* ... ... M
coronillifolia, *Salisbury* ... C
colutoides, *F. v. Mueller* ... ... W
phacoides, *Bentham* ... ... F C S M A . Y
Burkittii, *F. v. Mueller* ... ... W
oligophylla, *F. v. Mueller* ... F C
Burkei, *F. v. Mueller* ... ... F
oroboides, *F. v. Mueller* C
campylantha, *F. v. Mueller* ... C S
procumbens, *F. v. Mueller* ... C . M A N . G
stipularis, *F. v. Mueller* ... C S W M A N
Oliverii, *F. v. Mueller* ... ... W
lessertiifolia, *DeCandolle* ... ... W M A N Y K T G
unifoliolata, *F. v. Mueller* ... F
microphylla, *A. Gray* ... ... F W M T
laxa, *R. Brown* ... ... F M Y

Lespedeza, A. Richard (1803).

lanata, *Bentham*... ... ... F

Psoralea, Linne (1742).

adscendens, *F. v. Mueller* ... ... A G
parva, *F. v. Mueller* ... ... A
patens, *Lindley* ... ... F C S W M A N G
eriantha, *Bentham* ... ... F S . M
balsamica, *F. v. Mueller* ... F
leucantha, *F. v. Mueller* ... F

Trigonella, Linne (1737).

suavissima, *Lindley*		F	C	S										

Lotus, Linne (1737).

corniculatus, *Linne*							A							G
australis, *Andrews*		F	C	S	W	M	A	N	Y	L	K	T	G	

Kennedya, Ventenat (1804).

monophylla, *Ventenat*							A			Y	L	K		
prostrata, *R. Brown*							A			Y	L	K	T	G
prorepens, *F. v. Mueller* ...	F													

Glycine, Linne (1737).

clandestina, *Wendland*... ...	F		S	W	M	A	N	Y	?			G		
Latrobeana, *Bentham*						A						G		
falcata, *Bentham*		C												
tabacina, *Bentham*		C	S	W			N							
sericea, *Bentham*	F	C			M									
tomentosa, *Bentham*		C												

Erythrina, Linne (1737).

vespertilio, *Bentham*	F													

Rhynchosia, Loureiro (1790).

minima, *DeCandolle*	F	.	S											

Galactia, P. Browne (1756).

tenuiflora, *Wight & Arnott* ...	F													

Vigna, Savi (1824).

lanceolata, Bentham	F	C												

Cassia, Linne.

Sophera, *Linne*	F	C	S											
venusta, *F. v. Mueller*	F													
notabilis, *F. v. Mueller* ...	F													
pleurocarpa, *F. v. Mueller* ...	F	C												
glutinosa, *DeCandolle*	F													
pruinosa, *F. v. Mueller* ...		C												
desolata, *F. v. Mueller*... ...	F	C	S											
Sturtii, *R. Brown*		C	S	W	M				Y					
artemisioides, *Gaud.*	F		S	W										
eremophila, *Cunningham* ...	F	C	S	W	M	A	N	Y	L	.				
circinata, *Bentham*					M									
phyllodinea, *R. Brown*... ...	F	C	S	W	M	A	N					T		

Petalostylis, R. Brown (1849).

labicheoides, *R. Brown* ...	F	C	S											

Bauhinia, Linne.

Leichhardtii, *F. v. Mueller* ...	F													
Carronii, *F. v. Mueller*... ...	.	C												

Neptunia, Loureiro (1790).

monosperma, *F. v. Mueller* ...	F													
gracilis, *F. v. Mueller*	F													

Æschynomene, Linne (1737).

Indica, *Linne* ... ... F C

Glycyrrhiza, Linne.

psoraleoides, *Bentham* ... ... M

Indigofera, Linne.

linifolia, *Retzius* ... ... F
monophylla, *DeCandolle* ... F
enneaphylla, *Linne* ... ... F
viscosa, *Lamarck* ... ... F C
hirsuta, *Linne* ... ... F C
australis, *Willdenow* ... ... F A N G
brevidens, *Bentham* ... ... F C
coronillifolia, *Cunningham* ... F

Tephrosia, Persoon (1807).

purpurea, *Persoon* ... ... F
sphaerospora, *F. v. Mueller* ... F

Sesbania, Persoon (1807).

aculeata, *Persoon* ... ... F C M

Clianthus, Banks & Solander (1832).

Dampieri, *Cunningham* ... C S W

Swainsonia, Salisbury (1806).

Greyana, *Lindley* ... ... M
coronillifolia, *Salisbury* ... C
colutoides, *F. v. Mueller* ... ... W
phacoides, *Bentham* ... ... F C S M A . Y
Burkittii, *F. v. Mueller* ... ... W
oligophylla, *F. v. Mueller* ... F C
Burkei, *F. v. Mueller* ... ... F
oroboides, *F. v. Mueller* C
campylantha, *F. v. Mueller* ... C S
procumbens, *F. v. Mueller* ... C . M A N . G
stipularis, *F. v. Mueller* ... C S W M A N
Oliverii, *F. v. Mueller* ... ... W
lessertiifolia, *DeCandolle* ... ... W M A N Y K T G
unifoliolata, *F. v. Mueller* ... F
microphylla, *A. Gray* ... ... F W M T
laxa, *R. Brown* ... ... F M Y

Lespedeza, A. Richard (1803).

lanata, *Bentham*... ... ... F

Psoralea, Linne (1742).

adscendens, *F. v. Mueller* ... ... A G
parva, *F. v. Mueller* ... ... A
patens, *Lindley* ... ... F C S W M A N G
eriantha, *Bentham* ... ... F S . M
balsamica, *F. v. Mueller* ... F
leucantha, *F. v. Mueller* ... F

Trigonella, Linne (1737).

suavissima, *Lindley* ... ... F C S

Lotus, Linne (1737).

corniculatus, *Linne* ... ... A G
australis, *Andrews* ... ... F C S W M A N Y L K T G

Kennedya, Ventenat (1804).

monophylla, *Ventenat* ... ... A Y L K
prostrata, *R. Brown* ... ... A Y L K T G
prorepens, *F. v. Mueller* ... F

Glycine, Linne (1737).

clandestina, *Wendland*... ... F S W M A N Y ? G
Latrobeana, *Bentham* ... ... A G
falcata, *Bentham* C
tabacina, *Bentham* ... ... C S W N
sericea, *Bentham* ... ... F C M
tomentosa, *Bentham* C

Erythrina, Linne (1737).

vespertilio, *Bentham* ... ... F

Rhynchosia, Loureiro (1790).

minima, *DeCandolle* ... ... F . S

Galactia, P. Browne (1756).

tenuiflora, *Wight & Arnott* ... F

Vigna, Savi (1824).

lanceolata, Bentham ... ... F C

Cassia, Linne.

Sophera, *Linne* ... ... F C S
venusta, *F. v. Mueller* ... ... F
notabilis, *F. v. Mueller* ... F
pleurocarpa, *F. v. Mueller* ... F C
glutinosa, *DeCandolle* ... ... F
pruinosa, *F. v. Mueller* ... C
desolata, *F. v. Mueller*... ... F C S
Sturtii, *R. Brown* ... ... C S W M Y
artemisioides, *Gaud.* ... ... F S W
eremophila, *Cunningham* ... F C S W M A N Y L .
circinata, *Bentham* ... ... M
phyllodinea, *R. Brown*... ... F C S W M A N T

Petalostylis, R. Brown (1849).

labicheoides, *R. Brown* ... F C S

Bauhinia, Linne.

Leichhardtii, *F. v. Mueller* ... F
Carronii, *F. v. Mueller*... C

Neptunia, Loureiro (1790).

monosperma, *F. v. Mueller* ... F
gracilis, *F. v. Mueller* ... ... F

Acacia, Willdenow.

continua, *Bentham*				W		A	N					
Peuce, *F. v. Mueller*		C										
spinescens, *Bentham*					M	A		Y	L	K		
colletioides, *Cunningham*				W	M							
genistioides, *Cunningham*				W								
rupicola, *F. v. Mueller*						A	N		L	K		
tetragonophylla, *F. v. Mueller*	F	C	S	W	M							
spondylophylla, *F. v. Mueller*	F											
lycopodifolia, *Cunningham*	F											
minutifolia, *F. v. Mueller*	F											
calamifolia, *Sweet*			S	W	M	A	N			K		
scirpifolia, *Meissner*	F			W								
juncifolia, *Bentham*	F											
rigens, *Cunningham*						A		Y	L		T	
gonophylla, *Bentham*				W								
sessiliceps, *F. v. Mueller*	F											
papyrocarpa, *Bentham*				W								
Gilesiana, *F. v. Mueller*				W								
armata, *R. Brown*					M	A	N		L	K	T	
strongylophylla, *F. v. Mueller*	F											
Sentis, *F. v. Mueller*	F	C	S									
aspera, *Lindley*					M							
acanthoclada, *F. v. Mueller*				W								
vomeriformis, *Cunningham*						A					T	
erinacea, *Bentham*				W								
obliqua, *Cunningham*					M	A	N					
lineata, *Cunningham*									L			
sublanata, *Bentham*			S	W			N					
pravifolia, *F. v. Mueller*			S				N					
acinacea, *Lindley*						A	N	Y	L			
anceps, *DeCandolle*									L			
dodonaeifolia, *Willdenow*									L	K	T	
microcarpa, *F. v. Mueller*					M			Y	L	K		
brachybotrya, *Bentham*					M	A	N	Y		K	T	
Spilleriana, *J. E. Brown*						A						
suaveolens, *Willdenow*												G
iteaphylla, *F. v. Mueller*			S									
Murrayana, *F. v. Mueller*		C										
notabilis, *F. v. Mueller*				W	M	A	N	Y	L	K		
retinodes, *Schlechtendal*						A	N		L	K		G
Wattsiana, *F. v. Mueller*							N					
pycnantha, *Bentham*			S			A	N		L	K		G
hakeoides, *Cunningham*			S		M			Y				
salicina, *Lindley*	F			W	M	A	N	Y	L	K		
pyrifolia, *DeCandolle*	F											
myrtifolia, *Willdenow*						A			L	K	T	G
verniciflua, *Cunningham*						A						
montana, *Bentham*					M	A					T	
impressa, *F. v. Mueller*	F											
estrophiolata, *F. v. Mueller*	F											
craspedocarpa, *F. v. Mueller*		C										
cochlearis, *Wendland*				W					L			
dictyophleba, *F. v. Mueller*	F											
retivenea, *F. v. Mueller*	F											
trineura, *F. v. Mueller*					M							
cyclopis, *Cunningham*				W								

melanoxylon, *R. Brown*	...	...	...	...	A	N				T	G
homalophylla, *Cunningham*	...	...	S	W	M						
stenophylla, *Cunningham*	...	C			M						
Oswaldi, *F. v. Mueller*	...	C		W	M	.		Y			
coriacea, *DeCandolle* ...	...	C									
sclerophylla, *Lindley* ...	...	...		...	M			Y	L		T		
farinosa, *Lindley* ...	...	...		...	M					K			
Whanii, *F. v. Mueller* ...	...	...		...	M					K			
lanigera, *Cunningham* ...	...	...		...	...		...	Y					
verticillata, *Willdenow* ...	...	...		...	...	A	N			K	.	G	
oxycedrus, *Sieber* ...	...	...		...	...		...		...		...	G	
rhigiophylla, *F. v. Mueller*	...	...		...	M								
stipuligera, *F. v. Mueller*	...	F											
lysiphloia, *F. v. Mueller*	...	F											
longifolia, *Willdenow* ...	...	...		...	...	A	.	Y	L	K	T	G	
Kempeana, *F. v. Mueller*	...	F											
acradenia, *F. v. Mueller*	...	F											
doratoxylon, *Cunningham*	...	F	C										
aneura, *F. v. Mueller* ...	...	F	C	S	W								
cibaria, *F. v. Mueller* ...	...	F											
cyperophylla, *F. v. Mueller*	...	F	C		.								
Burkitti, *F. v. Mueller* ...	...		...	.	W								
Farnesiana, *Willdenow* ...	...	F	C										
Mitchelli, *Bentham* ...	...		.									G	
mollissima, *Willdenow* ...	...		...		...		...		...		T	G	
dealbata, *Link*	...		...		...		...		...		T	G	

THYMELEAE.

Pimelea, Banks & Solander (1788).

trichostachya, *Lindley* ...	...	F	C										
curviflora, *R. Brown* ...	...		...		W	M	A	N	Y		K		
simplex, *F. v. Mueller* ...	...	F	C	S	W								
phylicoides, *Meissner* ...	...		...		W		A		Y		K		G
octophylla, *R. Brown* ...	...		...		...	M	A	N	Y	L	K		G
petraea, *Meissner* ...	...		...	S	W								
glauca, *R. Brown* ...	...		...		...	M	A	N	Y	L	K	T	G
ligustrina, *Labillardiere*	...		...		...		... A				K		G
stricta, *Meissner* ...	...		...		...		... A				K		
spathulata, *Labillardiere*	...		...		...		... A	N			K		
humilis, *R. Brown* ...	...		...		...		... A					T	G
microcephala, *R. Brown*	...	F	C	S	W	M				L	K		
serpyllifolia, *R. Brown*	...		...		...	M	A		Y	L	K	.	G
elachantha, *F. v. Mueller*	...		..		...		...		...		...	T	G
flava, *R. Brown*	...		...		...	M	A			L	K		
petrophila, *F. v. Mueller*	...		...	S				N					
ammocharis, *F. v. Mueller*	...	F											

PROTEACEAE.

Petrophila, R. Brown (1809).

multisecta, *F. v. Mueller*	...	...	...	...	...	...	K						

Isopogon, R. Brown (1809).

ceratophyllus, *R. Brown*	...	...	...	...	A					K	T	G	

Adenanthos, Labillardiere (1804).

sericea, *Labillardiere*	...	...	...	...	...	...	...					K		
terminalis, *R. Brown*	...	...	...	...	...	A				L		K		G

Conospermum, Smith (1798).

patens, *Schlechtendal*	...	...	...	...	...	A				L		K	T	G
Mitchellii, *Meissner*	...	...	...	...	...		...			...			...	G

Persoonia, Smith (1798).

juniperina, *Labillardiere*	...	...	...	...	A								T	

Grevillea, R. Brown (1809).

Huegelii, *Meissner*	...	...	...		W	M	A	N	Y	L				G
Treueriana, *F. v. Mueller*	...	F			W									
ilicifolia, *R. Brown*	...	...	...		...	M	A	N	Y	L		K	T	
aquifolium, *Lindley*	...	...	...		...	...		...		...			T	
angulata, *R. Brown*	...	...	F											
Wickhami, *Meissner*	...	...	F											
agrifolia, *Cunningham*	...	...	F											
pterosperma, *F. v. Mueller*	...	F	C		W	M								
stenobotrya, *F. v. Mueller*	...	F												
juncifolia, *Hooker*	...	...	F	C		W								
halmaturina, *Tate*	...	...	...		...	...		...		L		K		G
nematophylla, *F. v. Mueller*	...		C	S	W									
striata, *R. Brown*	...	...	F	C										
lavandulacea, *Schlechtendal*	...		...		...	...	A	N		L		K	T	G
aspera, *R. Brown*	...	...	...		W					L		K		
pauciflora *R. Brown*	...	...	...		...	...		...		L		K		

Hakea, Schrader (1797).

chordophylla, *F. v. Mueller*	...	F												
lorea, *R. Brown*	...	...	F											
macrocarpa, *Cunningham*	...	...	F											
multilineata, *Meissner*	...	...	F			W								
Baxteri, *R. Brown*	...	...	...			W								
Ednieana, *Tate*	...	...	...		S									
purpurea, *Hooker*	...	...	F				M							
vittata, *R. Brown*	...	...	...		...	...		A			L		T	
nodosa, *R. Brown*	...	...	...		...	...		...		...		...		G
cycloptera, *R. Brown*	...	...	...		...	...		...			L			
leucoptera, *R. Brown*	...	...	F	C	S		M			Y				
rostrata, *F. v. Mueller*	...	...	...		...	...		A				K		G
rugosa, *R. Brown*	...	...	...		...	...		A	N	Y	L	K	T	G
ulicina, *R. Brown*	...	...	...		...	...		A		Y		K	T	G
nitida, *R. Brown*	...	...	...		W									

Banksia, Linne fils (1781).

marginata, *Cavanilles*	...	...	...	...	...	A		N		L		K	T	G
ornata, *F. v. Mueller*	...	...	...	...	...	A						K	T	G

SAXIFRAGEAE.

Bauera, Banks (1793).

rubioides, *Andrews*	...	...	...	...	...	A						K		

CRASSULACEAE.

Tillaea, Linne.

verticillaris, *De Candolle*	...		C	S	W	M	A	N	Y	L	K	T	G
purpurata, *Hooker*	...	...	...		...		A	N	Y				G
recurva, *Hooker*...	...	...	...		...	M	A				K		G
macrantha, *Hook.*	...	...	...		...	M	A		Y	L	K		G

ROSACEAE.

Geum, Linne (1737).

urbanum, *Linne*	...	...	...	...	...	...	...	...	...	G

Potentilla, Linne (1737).

anserina, *Linne* ...	...	...	...	...	...	A				G

Rubus, Linne.

parvifolius, *Linne*	...	...	...	...	...	A			K	G

Acaena, Linne (1771).

ovina, *Cunningham*	...	...	...	...	...	A	N	Y	L	K	T	G
Sanguisorbae, *Vahl*	...	...	...	...	...	A				K		G

Stylobasium, Desfontaines (1819).

spathulatum, *Desfontaines*	...	F											

FICOIDEAE.

Mesembrianthemum, Linne (1737).

aequilaterale, *Haworth*	...	F	.	S	W	M	A	N	Y	L	K	T	G
australe, *Solander*	...	...	...		W	M	A	N	Y	L	K	T	

Tetragonia, Linne (1737).

expansa, *Murray*	...	...	C	S	W	M		N					
implexicoma, *Hook.*	...	...	...		...	A	N	Y	L	K	T	G

Gunnia, F. v. Mueller (1858).

septifraga, *F. v. Mueller*	...	C											

Aizoon, Linne (1737).

quadrifidum, *F. v. Mueller*	...	C	S	W									
zygophylloides, *F. v. Mueller*	...	C	S										

Trianthema, Linne.

turgidifolia, *F. v. Mueller*	...	F											
crystallina, *Vahl*	...	...	C	S		M							
pilosa, *F. v. Mueller*	...	...	F	C									
humillima, *F. v. Mueller*	...	...	...		...	...	...	..	Y				

Zaleya, Burmann (1768).

decandra, *Burmann*	...	...	C	W									

Mollugo, Linne (1737).

hirta, *Thunberg*	F	C	S		M							
orygioides, *F. v. Mueller* ...		C										
Spergula, *Linne*					M							
Cerviana, *Seringe*	F			W	M							

LYTHRARIEAE.

Lythrum, Linne (1737).

Salicaria, *Linne*						A						G
hyssopifolia, *Linne*	F	C				A						G

Rotala, Linne (1771).

diandra, *F v. Mueller*	F											
verticillaris, *Linne*	F											

Ammannia, Linne (1737).

baccifera, *Linne*...		C										
multiflora, *Roxburgh*	F				M							

ONAGREAE.

Epilobium, Linne (1737).

glabellum, *G. Forster*			S			A	N		L	K		G

Jussieua, Linne (1737).

diffusa, *Forskael*...					M	A						G

MYRTACEAE.

Darwinia, Rudge (1813).

micropetala, *Bentham*				W						K		
Schuermanni, *Bentham*...									L			

Verticordia, DeCandolle (1813).

Wilhelmii, *F. v. Mueller*									L			

Calycothrix, Labillardiere (1806).

longiflora, *F. v. Mueller* ...	F											
tetragona, *Labillardiere*						A	N	Y	L	K	T	G

Lhotzkya, Schauer (1835).

glaberrima, *F. v. Mueller*										K		
genetylloides, *F. v. Mueller*											T	G
Smeatoniana, *F. v. Mueller*										K		

Thryptomene, Endlicher (1838).

Maisonneuvii, *F. v. Mueller* ...	F											
flaviflora, *F. v. Mueller*... ...	F											
Mitchelliana, *F. v. Mueller*					M						T	
auriculata, *F. v. Mueller*				W								
Elliottii, *F. v. Mueller*				W								
ericaea, *F. v. Mueller*										K		
Miqueliana, *F. v. Mueller*								Y	L			
ciliata, *F. v. Mueller*										K	T	G

Baeckea, Linne (1753).

diffusa, *Sieber*	...	...	...	...	A					K				
crassifolia, *Lindley* ...	...	...	...	...		...	Y	L	K	T	G			
ericaea, *F. v. Mueller* ...	...	...	...	...		...		...		T				
polystemona, *F. v. Mueller* ...	F													
Behrii, *F. v. Mueller* ...	...	...	W					L		T				

Leptospermum, R. & G. Forster (1776).

laevigatum, *F. v. Mueller*	...	...	W	M			Y		K	T				
scoparium, *Forster* ...	...	...	...	...	A	N			K		G			
lanigerum, *Smith* ...	...	...	...	...	A				K		G			
myrsinoides, *Schlechtendal*	...	...	...	...	A				K	T	G			

Kunzea, Reichenbach (1828).

pomifera, *F. v. Mueller*	...	...	...	...	A				K	T	G			

Callistemon, R. Brown (1814).

coccineus, *F. v. Mueller*	...	...	...	...	A	N	Y	L	K	T	G			
salignus, *DeCandolle* ...	...	...	...	...	A					T				
teretifolius, *F. v. Mueller*	...	...	S		A									
brachyandrus, *Lindley*...	...	...	...	M						T				

Melaleuca, Linne (1767).

squamea, *Labillardiere*...	...	...	...	...	...		...	K		G				
Wilsonii, *F. v Mueller*	...	...	...	...	...		L		T	G				
gibbosa, *Labillardiere* ...	...	...	...	...	...		...	K		G				
decussata, *R. Brown* ...	...	...	...	...	A		L	K	T	G				
squarrosa, *Smith* ...	...	...	...	...	...		...	K	T	G				
glomerata, *F. v. Mueller*	...	F	C	S										
trichostachya, *Lindley*...	...		C											
parviflora, *Lindley* ...	...	F		S	W	M	A	N	Y	L	K	T	G	
cylindrica, *R. Brown* ...	...	...	...	...	...		...	...	K					
acuminata, *F. v. Mueller*	...	...	...	M	A		Y	L	K	T				
quadrifaria, *F. v. Mueller*	...	...	W											
uncinata, *R. Brown* ...	...	...	W	M	A	N	Y	L	K	T				
ericifolia, *Smith*... ...	...	...	...	...	...		...	...	...	G				
pustulata, *Hooker* ...	...	...	...	...	A		Y	L	K	T	G			

Eucalyptus, L'Heritier (1788).

corynocalyx, *F. v. Mueller*	...	...	...	...	N		L	K						
gamophylla, *F. v. Mueller*	...	F												
tessellaris, *F. v. Mueller*	...	F												
incrassata, *Labillardiere*	...	...	S	W	M	A	N	Y	L	K	T	G		
hemiphloia, *F. v. Mueller*	...	...	...	...			N		L	K	T			
gracilis, *F. v. Mueller* ...	...	...	...	M	A		N	Y		K	T			
odorata, *F. v. Mueller* ...	...	...	...	...	A		N	Y		K	T	G		
pauciflora, *Sieber* ...	...	...	...	...	...		...		...		...	G		
amygdalina, *Labillardiere*	...	...	...	...	...		...		...		...	G		
obliqua, *L'Heritier* ...	...	...	...	...	A				K			G		
Sieberiana, *F. v. Mueller*	...	...	...	...	...		...		K			G		
paniculata, *Smith* ...	...	...	...	...	A				K			G		
largiflorens, *F. v. Mueller*	...	...	...	M					K	T				
Behriana, *F. v. Mueller*	...	...	...	...			N		L	K	T			
oleosa, *F. v. Mueller* ...	...	...	S				N	Y			T			
terminalis, *F. v. Mueller*	...	F												
setosa, *Schauer*	...	F												

goniocalyx, *F. v. Mueller*	...	...	...	...	A	N			K				
leucoxylon, *F. v. Mueller*	...	...	...	...	A	N		L	K	T	G		
uncinata, *Turczaninow* ...	...	...	...	M	A		Y		K	T			
cneorifolia, *DeCandolle* ...	...	...	...	...		...		L	K				
microtheca, *F. v. Mueller*	...	F	C										
Stuartiana, *F. v. Mueller*	...	...	...	...		...		...		...	G		
viminalis, *Labillardiere*	...	...	...	...	A			L	K		G		
rostrata, *Schlechtendal* ...	...	F	C	S	W	M	A	N		L	K	T	G
Gunnii, *Hooker*	...	...	...	...	A						G		
cosmophylla, *F. v. Mueller*	...	...	...	...	A			L	K				
santalifolia, *F. v. Mueller*	...	...	...	...	A			L	K		G		
capitellata, *Smith* ...	...	...	...	...	A				K	T	G		
macrorrhyncha, *F. v. Mueller* ...		...	...	...	A								
Oldfieldii, *F. v. Mueller*	...	F											
pachyphylla, *F. v. Mueller*	...	F											
pyriformis, *Turczaninow*	...	F		W									

RHAMNACEAE.

Ventilago, Gaertner (1788).

viminalis. *Hooker*	...	...	F

Pomaderris, Labillardiere (1804).

myrtilloides, *Fenzl*	...	...		W								
apetala, *Labillardiere* ..	...	...	...	...	...	N					G	
racemosa, *Hooker*	...	...	...	...	A	N	Y	L	K		G	
obcordata, *Fenzl* ...	...	...	...	...	...	N	Y	L	K		G	

Cryptandra, Smith (1798).

Wayii, *F. v. Mueller & Tate* ...	...	...	...	A	N							
Hookeri, *F. v. Mueller* ...	...	...	...	A						G		
phlebophylla, *F. v. Mueller*	...	...	S									
spathulata, *F. v. Mueller*	...	F			A			L	K		G	
coactilifolia, *F. v. Mueller*	...	...	...	A								
leucophracta, *Schlechtendal*	...	...	W	M			Y	L	K			
obovata, *Hooker* ...	...	...	...	A					K			
vexillifera, *Hooker* ...	...	...	...	A			Y	L	K	T	G	
subochreata, *F. v. Mueller*	...	...	...	M	A			L		T	G	
halmaturina, *F. v. Mueller*	...	...	...	A					K			
bifida, *F. v. Mueller* ...	...	...	...	...		...		L				
scabrida, *Tate*	...	...	...	...		...		...	K			
Waterhousei, *F. v. Mueller*	...	...	...	...		...		...	K			
hispidula, *Reisseck* ...	...	...	...	A					K	T		
propinqua, *Cunningham*	...	...	...	M								
amara, *Smith*	...	...	W		A							
tomentosa, *Lindley* ...	...	...	W	M	A		Y	L				

OLACINEAE.

Olax, Linne (1747).

Benthamiana, *Miquel* ...	...	...	...	...	...	L	K	

SANTALACEAE.

Santalum, Linne (1742).

lanceolatum, *R. Brown* ...	...	F	C	S								
acuminatum, *DeCandolle*	...	F		S	W	M	A	N	Y	L	K	
persicarium, *F. v. Mueller*	...	...		S		M	A	N	Y			T

Choretrum, R. Brown (1810).

glomeratum, *R. Brown*...	...	...	...	...	A			Y	L	K	T	
chrysanthum, *F. v. Mueller*	...	...	...	...	A			Y				
spicatum, *F. v. Mueller*	...	...	...	M						K	T	

Leptomeria, R. Brown (1810).

aphylla, *R. Brown*	...	...	...	...	M	A	N		L	K		G

Anthobolus, R. Brown (1810).

exocarpoides, *F. v. Mueller*	...	F												

Exocarpos, Labillardiere (1798).

cupressiformis, *Labillardiere*	...	...	...	M	A		Y	L	K	T	G
spartea, *R. Brown*	...	...	F		M	A		Y	L			
aphylla, *R. Brown*	...	...	...	S	W	M	A	N	Y	L			
stricta, *R. Brown*	...	...	...	...	M				L		T	G

HALORAGEAE.

Loudonia, Lindley (1839).

Behrii, *Schlechtendal*	...	...	...	...	...	A		Y	L	K	T	
aurea, *Lindley* ...	...	...	...	S	W					K		

Haloragis, R. & G. Forster (1776).

Meionectes, *F. v. Mueller*	...	...	...	...	A							G
heterophylla, *Brongniart*	...	C	S		M	A	N	Y	L			G
digyna, *Labillardiere*	...	...		W	M	A				K		G
elata, *Cunningham*	...	...		W		A				K		
aspera, *Lindley* ...	...	...	F	C	S	W	M	A	N	Y				G
acutangula, *F. v. Mueller*	...	...	...	...	...	...		L				
odontocarpa, *F. v. Mueller*	...	...		W	M							
trigonocarpa, *F. v. Mueller*	...	F										
Gossei, *F. v. Mueller* ...	...	F										
micrantha, *R. Brown* ...	...	...	...	..	...	A						G
tetragyna, *R. Brown* ...	...	...	...	...	...	A	N	Y	L	K	T	G
teucrioides, *A. Gray* ...	...	...	...	...	...	A	N	Y	L	K		G

Myriophyllum, Linne (1767).

integrifolium, *Hooker* ...	...	...	...	M	A					T	G
amphibium, *Labillardiere*	...	...	...	...	A						G
pedunculatum, *Hooker*...	...	...	...	...	...	...	.	...		...	G
verrucosum, *Lindley* ...	...	F		M	A			L			G
Muelleri, *Sonder* ...	...	...	...	...	A			L	K		
intermedium, *DeCandolle*	...	...	...	M	A				K		G
elatinoides, *Gaudichaud*	...	...	...	M	A				K	T	G

Callitriche, Linne (1748).

verna, *Linne*	...	...	...	...	...	M	A				T	

UMBELLIFERAE.

Actinotus, Labillardiere (1804).

Schwarzii, *F. v. Mueller*	...	F												

Hydrocotyle, Linne.

vulgaris, *Linne*	...	...	...	S		M	A	N				T	G
Asiatica, *Linne* ...	...	...	...	S		M	A				K		G
Candollei, *F. v. Mueller*		...		S			A	N			K	T	G
hirta, *R. Brown*...	...	...	...		...		A			L	K		G
pterocarpa, *F. v. Mueller*		...	...		...		...		...	...		...	G
comocarpa, *F. v. Mueller*		...	...		...		...		...	...		K	
tripartita, *R. Brown* ...		...	...		...		...		...	...		K	G
callicarpa, *Bunge* ...		...	...	S		M	A	N	Y	L	K	T	G
trachycarpa, *F. v. Mueller*		...	F	S									
crassiuscula, *Tate* ...		...	...		...		...		...	...		K	
capillaris, *F. v. Mueller*		...	...		W		A		Y	L	K		G
medicaginoides, *Turcz.*		...	...		...		...		Y				
diantha, *DeCandolle* ...		...	...		...		...			...	K		

Didiscus, DeCandolle (1828).

pusillus, *F. v. Mueller* ...		...	...		...		A		Y	L	K		
cyanopetalus, *F. v. Mueller*		...	F				M		Y	L			
eriocarpus, *F. v. Mueller*		...		...	S	W			Y	L			
pilosus, *Bentham* ...		...	...		...		...		...	...		...	G
glaucifolius, *F. v. Mueller*		...	F	C	S								

Trachymene, Rudge (1810).

heterophylla, *F. v. Mueller*		...	...	...		...	A			L	K		

Xanthosia, Rudge (1810).

pusilla, *Bunge* ...	...	...	...	...		...	A		Y				
dissecta, *Hooker*	...	...	...	...		...	A			L	K	T	G

Eryngium, Linne.

rostratum, *Cavan.* ...	...	...	...		...	A						T	G
vesiculosum, *Labillardiere*	...	...	...		...	A					K		G
plantagineum, *F. v. Mueller*	...		C										

Crantzia, Nuttall (1818).

lineata, *Nuttall*...	...	...	...	...	M	A					K		G

Caldasia, Lagasca (1821).

andicola, *Lagasca*	...	...	...	...	...		...		...			...	G

Apium, Linne.

prostratum, *Labillardiere*	...	...	...	M	A	N	Y	L	K	T	G		

Sium, Linne.

latifolium, *Linne*	...	...	...	...		...	A						

Daucus, Linne.

brachiatus, *Sieber*	...	...	F	C	S	W	M	A	N	Y	L	K	T	G

CUCURBITACEAE.

Cucumis, Linne.

Chate, *Linne* ...	...	...	F				M						

Momordica, Linne.

Charantia, *Linne* ... ... F

Melothria, Linne.

Muelleri, *Bentham* ... ... M
Maderaspatana, *Cogniaux* ... F S

LORANTHACEAE.

Loranthus, Linne (1740).

celastroides, *Sieber* ... ... G
angustifolius, *R. Brown* L
Exocarpi, *Behr* ... ... F C S W A Y
linearifolius, *Hooker* ... ... S
Murrayi, *Tate* ... ... S
linophyllus, *Fenzl* ... ... F C W M A Y
gibberulus, *Tate* ... ... F C
pendulus, *Sieber*... ... ... F C W A Y L G
Quandang, *Lindley* ... ... F C S
grandibracteus, *F. v. Mueller*... C

Viscum, Linne.

articulatum, *Burm.* C

RUBIACEAE.

Oldenlandia, Linne.

tillaceaca, *F. v. Mueller* ... F C S

Dentella, Forster (1776).

repens, *Forster* ... ... F C

Canthium, Lamarck (1783).

latifolium, *F. v. Mueller* ... F

Coprosma, Forster (1776).

hirtella, *Labillardiere* ... ... G

Opercularia, Gaertner (1788).

ovata, *J. Hooker* ... ... A G
varia, *J. Hooker* ... ... A Y K G
scabrida, *Schlechtendal*... ... ... A L

Pomax, Solander (1788).

umbellata, *Solander* ... ... F S W N

Spermacoce, Linne.

marginata, *Bentham* ... ... F

Asperula, Linne.

geminifolia, *F. v. Mueller* ... ... M T
oligantha, *F. v. Mueller* ... ... S M A N Y K T G

Galium, Linne.

umbrosum, *Solander* ... ... W M A N Y L K T G
australe, *DeCandolle* ... ... S M A N Y K T G

CAPRIFOLIACEAE.

Sambucus, Linne.

Gaudichaudiana, *DeCandolle* ... ... G

COMPOSITAE.

Siegesbeckia, Linne (1737).

orientalis, *Linne* ... ... F W A N G

Wedelia, Jacquin (1763).

platyglossa, *F. v. Mueller* ... C M A T
verbesinoides, *F. v. Mueller* ... F

Bidens, Linne (1753).

bipinnata, *Linne* ... ... F

Glossogyne, Cassini (1827).

tenuifolia, *Cassini* ... ... F S

Flaveria, Jussieu (1789).

Australasica, *Hooker* C

Aster, Linne.

Sonderi, *F. v. Mueller* ... ... A
pannosus, *F. v. Mueller* ... ... A N Y L T G
pimeloides, *Cunningham* ... ... S W M N
myrsinoides, *Labillardiere* ... ... G
Mitchelli, *F. v. Mueller* ... F M Y
tubuliflorus, *F. v. Mueller* ... ... A K T
axillaris, *F. v. Mueller*... ... ... A N Y L K T G
microphyllus, *Ventenat* ... ... G
ramulosus, *Labillardiere* ... ... W M A Y L K G
exiguifolius, *F. v. Mueller* ... ... W
lepidophyllus, *Persoon*... ... ... A Y T
stellulatus, *Labillardiere* ... ... G
asterotrichus, *F. v. Mueller* ... ... G
magniflorus, *F. v. Mueller* ... ... W M
calcareus, *F. v. Mueller* ... ... S W M
Muelleri, *Sonder* ... ... C W M Y T
Stuartii, *F. v. Mueller* ... ... W
decurrens, *Cunningham* ... ... M Y L
glutescens, *F. v. Mueller* ... ... S M A Y T G
teretifolius, *F. v. Mueller* ... ... M A Y K G
glandulosus, *Labillardiere* ... G
megalodontus, *F. v. Mueller* ... F
Ferresii, *F. v. Mueller* ... ... F
exul, *Lindley* .. .. W M A N Y L K G
Huegelii, *F. v. Mueller* ... ... W A Y L K T G

Podocoma, Cassini (1817).

cuneifolia, *R. Brown* ... ... F C S

Vittadinia, Richard (1832).

australis, *Richard* ... ... F S W M A N Y L K T G

Dimorphocoma, F. v. Mueller & Tate (1883).

minutula, *F. v. Mueller & Tate* — S

Minuria, DeCandolle (1836).

leptophylla, *DeCandolle*	F	C	S	W	M	A	N	Y	L		T
Cunninghamii, *Bentham*	F	C	S		M			Y			
integerrima, *Bentham*		C	S		M						
denticulata, *Bentham*	F	C	S		M						
suaedifolia, *F. v. Mueller*		C		W			N	Y	L		T

Achnophora, F. v. Mueller (1883).

Tatei, *F. v. Mueller* — K

Calotis, R. Brown (1820).

cuneifolia, *R. Brown*					M	A	N				
hispidula, *F. v. Mueller*	F	C	S	W	M		N	Y			
cymbacantha, *F. v. Mueller*	F	C	S	W			N				
erinacea, *Steetz*		C	S		M	A		Y	L		
scabiosifolia, *Sonder & F. v. M.*			S			A					
scapigera, *Hooker*					M						
lappulacea, *Bentham*	F	C	S								
microcephala, *Bentham*	F										
plumulifera, *F. v. Mueller*		C	S								
porphyroglossa, *F. v. Mueller*	F	C									
Kempei, *F. v. Mueller*	F										

Lagenophora, Cassini (1818).

Billardieri, *Cassini*					A				L	K		G
Huegelii, *Bentham*					A		N	Y	L			G

Brachycome, Cassini (1816).

goniocarpa, *Sonder & F. v. M.*				M		N			L		
pachyptera, *Turczaninow*	C	S	W	M	A	N	Y				
collina, *Bentham*					A	N	Y	L			
Muelleri, *Sonder*					A			L		T	G
graminea, *F. v. Mueller*			W	M	A						G
basaltica, *F. v. Mueller*					A						
trachycarpa, *F. v. Mueller*		S	W		A	N					G
diversifolia, *Fischer & Meyer*					A						G
ciliaris, *Lessing*	F	C	S	W	M	A	N	Y	L		T
debilis, *Sonder*					A				L		
chrysoglossa, *F. v. Mueller*				M							
calocarpa, *F. v. Mueller*		S		M	A						
exilis, *Sonder*				M	A	N			L		
melanocarpa, *Sonder & F. v. M.*	C		W	M							
cardiocarpa, *F. v. Mueller*											G
cuneifolia, *Tate*									L	K	
decipiens, *Hooker*											G

Erodiophyllum, F. v. Mueller (1875).

Elderi, *F. v. Mueller* — C W

Cymbonotus, Cassini (1825).

Lawsonianus, *Gaudichaud* — A N Y L K G

Solenogyne, Cassini.

emphysopus, *F. v. Mueller*	...	...	...	...	A						K	T	G

Isoetopsis, Turczaninow (1851).

graminifolia, *Turczaninow*	...	...	S		M	A	N	Y	L	K	T		

Toxanthus, Turczaninow (1851).

perpusillus, *Turczaninow*	...	...			M		N	Y					
Muelleri, *Bentham*	...	...	...	...	M	A			L	K			

Quinetia, Cassini (1830).

Urvillei, *Cassini*	...	...	...	...	...	A			L				

Millotia, Cassini (1829).

tenuifolia, *Cassini*	...	...	...	S	W	M	A	N	Y	L	K	T	G
Greevesii, *F. v. Mueller*	...		C	S		M							
Kempei, *F. v. Mueller*	...	F		S	W								

Erechthites, Rafinesque (1817).

prenanthoides, *DeCandolle*	...	...	...	...	...	...	...				G
picridioides, *Turczaninow*	...	F					N	Y		K	T	
arguta, *DeCandolle*	...	...	...	S		A				K	T	G
mixta, *DeCandolle*	...	...	...	...	M				L			
quadridentata, *DeCandolle*	...	...	...	...	M	A	N	Y	L	K		G
hispidula, *DeCandolle*	...	...	...	...	M	A		Y	L		T	G

Senecio, Linne.

Gregorii, *F. v. Mueller*	...	F	C	S	W	M								
platylepis, *DeCandolle*	...	...	...	...	M									
spathulatus, *Richard*	...	...	...	...	...	...	...	...			G
megaglossus, *F. v. Mueller*	...	...	...	...	N							
magnificus, *F. v. Mueller*	...	F		S									
lautus, *Solander*	...	...	F	C	S	W	M	A	N	Y	L	K		G
Behrianus, *Sonder & F. v.M.*	...	...	...	...	M								
dryadeus, *Sieber*	...	...	...	...	...	...	...	...	...	G
anethifolius, *Cunningham*	...	...	S			N							
odoratus, *Hornemann*	...	F				A	N		L	K		G
hypoleucus, *Bentham*	...	...	...	...	...	A							
Cunninghamii, *DeCandolle*	...	C	S	W	M	A	N	Y		K			
Georgianus, *DeCandolle*	...	...	...	...	A				K			
brachyglossus, *F. v. Mueller*	...	C	S	W	M	A	N	Y					

Cotula, Linne (1735).

filifolia, *Thunberg*	...	...	...	...	M	A	N		L	K	T	G
coronopifolia, *Linne*	...	...	C	S		M	A	N		L	K	T	G
australis, *Hooker*	...	...	...	...	M	A	N		L	K	T	G
reptans, *Bentham*	...	...	...	...	...	...	...	...	...	G

Centipeda, Loureiro (1790).

orbicularis, *Loureiro*	...	...	C		M								
Cunninghamii, *F. v. Mueller*	...	F	C		M	A	N	Y	L	K	T	G
thespidioides, *F. v. Mueller*	...	F	C	S		M							

Ceratogyne, Turczaninow (1851).

obionoides, *Turczaninow*	...	...	S										

Ethuliopsis, F. v. Mueller (1861).

Cunninghamii, *F. v. Mueller* ...			C	S		M								

Epaltes, Cassini (1818).

australis, *Lessing*	...	...	F	C			M							
Tatei, *F. v. Mueller*	...	...	...	...	...	...					L		T	

Stuartina, Sonder (1852).

Muelleri, *Sonder*	...	...	...	S		M	A	N	Y	L	K	T	G

Humea, Smith (1804).

squamata, *F. v. Mueller*	...	...	...		M							T		
casuinacea, *F. v. Mueller*	...	...	...	...	...					L				

Ixodia, R. Brown (1812).

achilleoides, *R. Brown* ...	...	...	...	...	A					L	K		G

Elachanthus, F. v. Mueller (1852).

pusillus, *F. v. Mueller* ...	...	...	S	W	M				Y					

Rutidosis, DeCandolle (1837).

helichrysoides, *DeCandolle*	...	F	C	S										
Pumilo, *Bentham*	...	...	...	...	...	A			Y	L				F

Pluchea, Cassini (1817),

conocephala, *F. v. Mueller*	...	...		W	M			N						
tetranthera, *F. v. Mueller*	...	F												
Eyrea, *F. v. Mueller*	...	...	F	C	S			N						

Pterigeron, DeCandolle (1836).

liatroides, *Bentham*	...	...		C	S	W								
microglossus, *Bentham*...	...	F												
adscendens, *Bentham*	...	...	F											
dentatifolius, *F. v. Mueller*	...	F												

Podosperma, Labillardiere (1806).

angustifolium, *Labillardiere* ...	...	...				M	A	N	Y	L	K	T	G

Ixiolaena, Bentham (1837).

leptolepis, *Bentham*	...	...		C	S		M							
supina, *F. v. Mueller*	...	...	...	...	...	A				L	K			
tomentosa, *Sonder & F. v. M.*...	F	C	W	S	M			N		L				

Athrixia, Ker (1823).

tenella, *Bentham*	...	...	...	S		M		N	Y	L		T		

Cassinia, R. Brown (1817).

aculeata, *R. Brown*	...	...	...	...	M				Y					G
arcuata, *R. Brown*	...	...	...	...	M	A			Y					
laevis, *R. Brown*	...	...	...	S	W									
punctulata, *F. v. M. & Tate* ...	...	...	...					N	Y	L	K	T		
spectabilis, *R. Brown*...	...	...	...	...	...				Y		K			

Podolepis, Labillardiere (1806).

rutidochlamys, *F. v. Mueller* ...			C										
canescens, *Cunningham* ...	F	C	S	W	M	A	N	Y	L		T		
acuminata, *R. Brown*		...		...		...A		Y					G
rugata, *Labillardiere*		...		...		...A		Y	L	K	T		G
Lessoni, *Bentham*		...	S			A							
Siemssenia, *F. v. Mueller* ...		C	S	W	M		N						

Gnaphalium, Linne (1737).

luteo-album, *Linne*	F	C	S		M	A	N	Y	L	K	T		G
Indicum, *Linne*	F												
Japonicum, *Thunberg*	F		S		M	A	N	Y	L	K	T		G
indutum, *Hooker*		...		...	M	A	N	Y	L	K			G

Leptorrhynchos, Lessing (1832).

tenuifolius, *F. v. Mueller* ...		...		...	...		...		...		...		G
squamatus, *Lessing*		...	S		M	A	N	Y	L		T		G
pulchellus, *F. v. Mueller* ...		C		W	M	A	N	Y	L		T		G
elongatus, *DeCandolle*		...		...		...A	N	Y			T		G
medius, *Cunningham*		...		...	M	A	N	Y	L		T		G
Waitzia, *Sonder*		...		W	M	A	N	Y	L				

Helipterum, DeCandolle (1837).

roseum, *Bentham*		...		W									
anthemoides, *DeCandolle* ...		...		...		...A	N				T		
polygalifolium, *DeCandolle* ...		...	S	W	M				L				
strictum, *Bentham*		C	S	W									
hyalospermum, *F. v. Mueller* ...		C	S	W	M	A	N	Y	L				
floribundum, *DeCandolle* ...	F	C	S	W	M		N	Y					
heteranthum, *Turczaninow* ...		...		...		...	...	Y					
tenellum, *Turczaninow*		...		W									
pygmaeum, *Bentham*		...	S	W	M	A	N	Y	L				
corymbiflorum, *Schlechtendal* ...		C	S	W	M	A	N	Y					
stipitatum, *F. v. Mueller* ...	F												
incanum, *DeCandolle*	F	C	S		M		N						
Cotula, *DeCandolle*		...		W	M								
Haigii, *F. v. Mueller*		...		W									
laeve, *Bentham*		...	S										
dimorpholepis, *Bentham* ...		...		...		...A	N	Y		K	T		
exiguum, *F. v. Mueller* ...		C		W	M	A	N	Y		K	T		G
moschatum, *Bentham*	F	C	S	W	M	A	N				T		
pterochaetum, *Bentham* ...	F	C	S	W									
Tietkensii, *F. v. Mueller* ...	F			W			N						
Charsleyae, *F. v. Mueller* ...	F												

Waitzia, Wendland (1808).

corymbosa, *Wendland*		...		W	M	A	N						

Helichrysum, Vaillant (1719).

Cassinianum, *Gaudichaud* ...	F	C		W									
Ayersii, *F. v. Mueller*	F												
Lawrencella, *F. v Mueller* ...	F	C		W									
semifertile, *F. v. Mueller* ...	F	C	S	W									
scorpioides, *Labillardiere* ...		...		...		...A					T		G
rutidolepis, *DeCandolle* ...	F					A							
lucidum, *Henckel*	F			W	M	A	N	Y	L	K			G
podolepideum, *F. v. Mueller*		C	S										

obtusifolium, *Son. & F. v. M.*	...	...	...	...	A		Y	L	K		G
Brandowskianum, *Steetz*	...	...	...	...	A						G
adenophorum, *F. v. Mueller*	...	...	...	...		...		...	K	T	
lepidium, *DeCandolle*	...	...	...	...	A	N	Y	L	K		G
Baxteri, *F. v. Mueller* ...	...	...	...	...	A		Y	L		T	G
ambiguum, *Turczaninow*	...	F	S		A						
Tepperi, *F. v. Mueller* ...	...	...	...	...	A		Y				
apiculatum, *DeCandolle*	...	F	C	S	W	M	A	N	Y	L	K	T	G
semipapposum, *DeCandolle*	...	...		W	M	A	N	Y			T	G
Dockerii, *F. v. Mueller*...	...	...		...	M						
Thomsoni, *F. v. Mueller*	...	F									
decurrens, *F. v. Mueller*	...	...		...	M	A	N		L		
retusum, *Sonder & F. v. Mueller*	...		S		M	A	N	Y	L	K	
ferrugineum, *Lessing* ...	...	...		...	...		...		...		...	G
cinereum, *F. v. Mueller*	...	...		...	...		...		...		...	G
Kempei, *F. v. Mueller* ...	...	F									

Polycalymma, F. v. Mueller.

Stuartii, *F. v. Mueller* ...	...	F	C	S	W	M						T	

Hyalolepis, DeCandolle.

rhizocephala, *DeCandolle*	...		...		...	M		N	Y	L	K	T	G
Rudallii, *F. v. Mueller*...	...	F	C										

Angianthus, Wendland (1809).

pleuropappus, *Bentham*	...		...		...	...		...		L			
brachypappus, *F. v. Mueller*	...		...	S									
tomentosus, *Wendland* ...	...	F		S		M	A	N	Y	L		T	
pusillus, *Bentham*	...	F	C	S	W	M							
tenellus, *Bentham*	...	...		...		...		...		L			

Skirrophorus, DeCandolle.

strictus, *A. Gray*	...	...	...	S		M	A	N	Y	L	K	T	
Preissianus, *Steetz*	...	...	...		...		...A			L	K	T	G

Gnephosis, Cassini (1820).

Burkittii, *Bentham*	...	...			W								
eriocarpa, *Bentham*	...	...	C										
arachnoidea, *Turczaninow*	...	C	S										
cyathopappa, *Bentham*...	...	...		...	M								
codonopappa, *F. v. Mueller*	...	C											
skirrophora, *Bentham* ...	...	C	S		M								

Calocephalus, R. Brown (1817).

Drummondii, *Bentham*...	...	...		W		A		Y	L		T	
Brownii, *F. v. Mueller*...	...	...		...		...A		Y	L	K		G
Sonderi, *F. v. Mueller* ...	...	...		...	M							
lacteus, *Lessing* ...	...	...		...		...A						
citreus, *Lessing* ...	...	...		...		...A	N	Y			T	G
platycephalus, *Bentham*	...	F	C	S									
Dittrichii, *F. v. Mueller*	...	C											

Eriochlamys, Sonder & F. v. Mueller (1852).

Behrii, *Sonder & F. v. Mueller*	...		...	M		N		L	K	T	
Knappii, *F. v. Mueller*...	...	F									

Cephalipterum, A. Gray (1852).

Drummondii, *A. Gray*... ... ... W

Gnaphalodes, A. Gray (1852).

uliginosum, *A. Gray* ... ... S W M A N Y T

Pterocaulon, Elliot (1824).

sphacelatus, *Benth. & Hook.* ... F C S
Billardieri, *F. v. Mueller* ... F

Craspedia, G. Forster (1786).

Richea, *Cassini* ... ... A N Y L T G
chrysantha, *Bentham* ... ... C M A
globosa, *Bentham* ... ... S N
pleiocephala, *F. v. Mueller* ... C S W M

Chthonocephalus, Steetz (1845).

pseudevax, *Steetz* ... ... C W

Microseris, D. Don (1832).

Forsteri, *J. Hooker* ... ... A N Y L K T G

CANDOLLEACEAE.

Candollea, Labillardiere (1805).

graminifolia, *Swartz* ... ... A K G
Tepperiana, *F. v. Mueller* ... ... K
calcarata, *R. Brown* ... ... A Y K G
perpusilla, *Hooker* ... ... G
floribunda, *R. Brown* ... ... F
despecta, *R. Brown* ... ... S A N L K T G

Leewenhoekia, R. Brown (1810).

dubia, *Sonder* ... ... A Y L K T G

CAMPANULACEAE.

Lobelia, Linne (1737).

rhombifolia, *DeVriese* ... ... A K
microsperma, *F. v. Mueller* ... ... A Y L K
Browniana, *Roem. & Schultes* ... ... G
simplicicaulis, *R. Brown* ... ... G
heterophylla, *Labillardiere* ... F
purpurascens, *R. Brown* ... ... G
pedunculata, *R. Brown* ... ... A G
concolor, *R. Brown* ... ... M
platycalyx, *F. v. Mueller* ... ... K G
anceps, *Thunberg* ... ... A N L K T G
pratioides, *Bentham* ... ... T G
Benthami, *F. v. Mueller* ... C

Isotoma, R. Brown (1810).

petraea, *F. v. Mueller* ... ... F C S W N
scapigera, *G. Don* L
fluviatilis, *F. v. Mueller* ... ... T G

Wahlenbergia, Schrader (1814).

gracilis, *DeCandolle*	F	C	S	W	M	A	N	Y	L	K	T	G

GOODENIACEAE.

Brunonia, Smith (1809).

australis, *Smith*	F					A					T	G

Leschenaultia, R. Brown (1810).

divaricata, *F. v. Mueller* ...	F	C										
striata, *F. v. Mueller*	F											

Dampiera, R. Brown (1810).

stricta, *R. Brown*													G
candicans, *F. v. Mueller* ...	F												
rosmarinifolia, *Schlechtendal*				W	M	A	N	Y	L		T		
marifolia, *Bentham*					M								
lanceolata, *Cunningham*					M					K			

Velleya, Smith (1798).

paradoxa, *R. Brown*					M	A	N	Y	L				G
connata, *F. v. Mueller*	F			W	M								

Selliera, Cavanilles (1799).

radicans, *Cavanilles*						A			L	K			

Catosperma, Bentham (1868).

Muelleri, *Bentham*	F												

Scaevola, Linne (1771).

spinescens, *R. Brown*	F	C	S	W	M			Y					
Groeneri, *F. v. Mueller*				W									
crassifolia, *Labillardiere*				W		A		Y	L	K			G
parvifolia, *F. v. Mueller* ...	F												
depauperata, *R. Brown* ...	F	C											
collaris, *F. v. Mueller*		C		W									
suaveolens, *R. Brown*											T	G	
microcarpa, *Cavanilles*						A	N					G	
semula, *R. Brown*	F		S	W					L	K		G	
humilis, *R. Brown*			S	W			N			K			
ovalifolia, *R. Brown*	F	C		W									
linearis, *R. Brown*						A		Y	L	K			

Goodenia, Smith (1794).

Ramelii, *F. v. Mueller*	F												
humilis, *R. Brown*												G	
amplexans, *F. v. Mueller*					A	N				K			
ovata, *Smith*					A			Y	L	K			G
varia, *R. Brown*			S	W	M	A	N	Y	L	K			
Vilmoriniae, *F. v. Mueller* ...	F												
grandiflora, *Sims*	F												
Chambersii, *F. v. Mueller* ...	F												
albiflora, *Schlechtendal*					A	N	Y						
calcarata, *F. v. Mueller*			S	W									

Nicholsoni, *F. v. Mueller* ...	F													
Mitchellii, *Bentham*	F	C												
heterochila, *F. v. Mueller* ...	F													
sepalosa, *F. v. Mueller*	F													
Mueckeana, *F. v. Mueller* ...	F													
Strangfordii, *F. v. Mueller* ...	F													
geniculata, *R. Brown*		...		W	M	A	N	Y	L	K	T	G		
hirsuta, *F. v. Mueller*	F													
cycloptera, *R. Brown*	F	C	S	W				Y						
glauca, *F. v. Mueller*		C	S		M	A	N	Y						
microptera, *F. v. Mueller* ...		C												
elongata, *Labillardiere*... ...		...		...	...		...		...		...	G		
heteromera, *F. v. Mueller* ...		C			M									
pinnatifida, *Schlecht.*		...	S	W	M	A	N	Y	L		T	G		
pusilliflora, *F. v. Mueller* ...		...	S	W										

Calogyne, R. Brown (1810).

Berardiana, *F. v. Mueller* ...	F	

PRIMULACEAE.

Centunculus, Linne (1753).

minimus, *Linne*	...	...	...	...	...	...	...	...	...	G				

Samolus, Linne (1753).

repens, *Persoon*	..	F			M	A	N	Y	L	K	T	G		

CONVOLVULACEAE.

Ipomoea, Linne (1737).

Davenporti, *F. v. Mueller* ...	F	
costata, *F. v. Mueller*	F	
Muelleri, *Bentham*	F	
heterophylla, *R. Brown* ...	F	C

Convolvulus, Linne (1753).

erubescens, *Sims*	F	C	S	W	M	A	N	Y	L	K	T	G		
sepium, *Linne*					...	A					T	G		

Polymeria, R. Brown (1810).

longifolia, *Lindley*	F	C
angusta, *F. v. Mueller*	F	C

Breweria, R. Brown (1810).

rosea, *F. v. Mueller*	F	
media, *R. Brown*		C

Evolvulus, Linne (1763).

linifolius, *Linne*	F	C

Cressa, Linne (1747).

Cretica, *Linne*					M									

Dichondra, Forster (1776).

repens, *Forster*			S			A	N		L	K	T	G		

Wilsonia, R. Brown (1810).

humilis, *R. Brown* ... ...A Y L K
rotundifolia, *Hooker* ... ...A Y L K T
Backhousii, *Hooker* ... ... K T G

CUSCUTA, Linne.

australis, *R. Brown* ... ... F
Tasmanica, *Engelmann*... ... ... T

BORAGINEAE.

Coldenia, Linne (1747).

procumbens, *Linne* C

Heliotropium, Linne.

curassavicum, *Linne* ... ... F C S M A T
pleiopterum, *F. v. Mueller* ... F
Europaeum, *Linne* ... ... S N
undulatum, *Vahl* ... ... F C W
asperrimum, *R. Brown*... ... F C S A N
ovalifolium, *Forskael* C
filaginoides, *Bentham* ... ... F C
tenuifolium, *R. Brown* ... ... F

Halgania, Gaudichaud (1826).

cyanea, *Lindley* ... ... F C S W M A Y L
lavandulacea, *Endlicher* ... ... W A Y K T

Pollichia, Medikus (1783).

Zeylanica, *F. v. Mueller* ... F C S

Rochelia, Reichenbach (1824).

Maccoya, *F. v. Mueller* ... ... M

Echinospermum, Swartz.

concavum, *F. v. Mueller* ... C S W M A N Y

Eritrichium, Schrader (1820).

Australasicum, *DeCandolle* ... ... S M N Y G

Myosotis, Linne.

australis, *R. Brown* ... ... M A Y K G

Cynoglossum, Linne.

suaveolens, *R. Brown* ... ... M A N Y T G
australe, *R. Brown* ... ...A L T G
Drummondii, *Bentham*... ... F C S N

ASCLEPIADEAE.

Sarcostemma, R. Brown (1809).

australe, *R. Brown* ... ... F C S W M N

Cynanchum, Linne (1737).

floribundum, *R. Brown* ... F C S

Daemia, R. Brown (1809.)

Kempeana, *F. v. Mueller* ... F C

Marsdenia, R. Brown (1809).

Leichhardtiana, *F. v. Mueller* F C S M

APOCYNEAE.

Carissa, Linne (1767).

Brownii, *F. v. Mueller* ... ... F

Alyxia, Banks (1810).

buxifolia, *R. Brown* ... ... A N Y L K T G

Notonerium, Bentham (1876).

Gossei, *Bentham* ... ... F

GENTIANEAE.

Sebaea, Solander (1810).

ovata, *R. Brown* ... ... M A N Y L K T G
albidiflora, *F. v. Mueller* ... ... G

Erythraea, Persoon (1805).

spicata, *Persoon* ... ... F C A N Y L K T G

Gentiana, Linne.

saxosa, *Forster* ... ... T G

Limnanthemum, Gmelin.

crenatum, *F. v. Mueller* ... ... M
reniformis, *R. Brown* ... ... S M A N L K T G

JASMINEAE.

Jasminum, Linne.

lineare, *R. Brown* ... ... F S M N
calcareum, *F. v. Mueller* ... F

PLANTAGINEAE.

Plantago, Linne.

varia, *R. Brown* ... ... C S W M A N Y L K T G

LOGANIACEAE.

Mitrasacme, Labillardiere (1804).

pilosa, *Labillardiere* ... ... G
paradoxa, *R. Brown* ... ... M A N Y L K G
distylis, *F. v. Mueller* .. .. A K

Logania, R. Brown (1810).

longifolia, *R. Brown*	...	...	...	...	...	A	N						
crassifolia, *R. Brown*	...	...	...	...	...		...		L	K	T	G
ovata, *R. Brown*...	...	...	...	...	...	A		Y	L	K		G
stenophylla, *F. v. Mueller*		...	...	W								
linifolia, *Schlecht.*	...	...	...	...	...	A		Y			T	
nuda, *F. v. Mueller*	...	...	...	W	M							

SOLANACEAE.

Solanum, Linne.

nigrum, *Linne* ...	...	...	C	S				A	N			K		G
aviculare, *Forster*	...	...		...		...		...	...		...		...	G
simile, *F. v. Mueller*	...	...		...	S	W	M	A	N	Y	L	K		
fasciculatum, *F. v. Mueller*		...				W				Y	L			
ferocissimum, *Lindley* ...		...	F		S									
orbiculatum, *Dunal*	...	...		C		W								
oligacanthum, *F. v. Mueller*	...	F	?											
esuriale, *Lindley*	...	...	F	C		W	M		N					
chenopodium, *F. v. Mueller*	...			C										
Sturtianum, *F. v. Mueller*	...	F	C	S	W									
hystrix, *R. Brown*	...	...		...		W								
eremophilum, *F. v. Mueller*	...			C	S				N					
lacunarium, *F. v. Mueller*	...			C	S	W								
petrophilum, *F. v Mueller*	...	F		C	S	W								
ellipticum, *R. Brown* ...	...	F		C	S	W								

Lycium, Linne (1737).

australe, *F. v. Mueller* ...	...	...	S	W	M	A		Y					

Anthotroche, Endlicher (1839).

Blackii, *F. v. Mueller* ...	...	F	

Datura, Linne (1737).

Leichhardtii, *F. v. Mueller*	...	F	S	

Nicotiana, Linne.

suaveolens, *Lehmann* ...	...	F	C	S	W	M	A	N	Y	L	K		G

Duboisia, R. Brown (1810).

Hopwoodi, *F. v. Mueller*	...	F		W

Anthocercis, Labillardiere (1806).

anisantha, *Endlicher* ...	...	...			W					L			
angustifolia, *F. v. Mueller*	...	...	S				A						
myosotidea, *F. v. Mueller*	...	...		...		...		...		...	K	T	
Eadesii, *F. v. Mueller* ...	...	...		...		...		...		...		T	

EPACRIDEAE.

Brachyloma, Sonder (1845).

ericoides, *Sonder*	...	...	...	...	M	A					K			
daphnoides, *Bentham* ...	...	...	...	...	...		...		...			T		
ciliatum, *Bentham*	...	...	...	...	...	A						T	G	

Styphelia, Solander (1786).

adscendens, *R. Brown* ...	...	...	...	...	...	...	...	...	G
pusilliflora, *F. v. Mueller*	...	...	...	...	...	...	...	...	G
Sonderi, *F. v. Mueller* ...	...	...	W	A		L	K	T	G
humifusa, *Persoon* ...	...	...	...	...	A	N	Y	L	K	T	G
strigosa, *Smith*	...	...	...	...	A			L	K		
australis, *F. v. Mueller*	...	...	...	...	A						G
Richei, *Labillardiere* ...	...	...	...	...	A	N	Y	L	K	T	G
costata, *F. v. Mueller* ...	...	...	...	...		...		...	K		
striata, *Sprengel*... ...	...	...	W								
collina, *Labillardiere* ...	...	...	...	...		...		...		T	
hirsuta, *F. v. Mueller* ...	...	...	...	...		...		...	K		
concurva, *F. v. Mueller*	...	...	...	...	A				K		
virgata, *Labillardiere* ...	...	...	...	...	A					T	G
ericoides, *Smith*	...	...	...	...		...		...		...	G
cordifolia, *F. v. Mueller*	...	...	W	M	A		Y	L			
hirtella, *F. v. Mueller* ...	...	...	...	...	A				K		
rufa, *F. v. Mueller* ...	...	...	...	...	A			L	K		
Woodsii, *F. v. Mueller*...	...	...	...	...		...		...	K		G
serrulata, *Labillardiere*	...	...	...	...	A				K		
patula, *Sprengel* ...	...	...	...	...	A		Y	L	K		
ovalifolia, *Sprengel* ...	...	...	...	...	A	N	Y	L	K	T	G
depressa, *Sprengel* ...	...	...	...	...	A				K	T	
fasciculiflora, *F. v. Mueller*	...	...	...	...	A				K		
elliptica, *Smith*	...	...	...	...		...		...		...	G

Epacris, Cavanilles (1797).

impressa, *Labillardiere*	...	...	...	...	A				K	T	G
obtusifolia, *Smith* ...	...	...	...	...		...		...		...	G
lanuginosa, *Labillardiere*	...	...	...	...		...		...		...	G
microphylla, *R. Brown*	...	...	...	...		...		...		...	G

Sprengelia, Smith (1794).

incarnata, *Smith*	...	...	...	...	A				K		G

LABIATAE.

Mentha, Linne.

australis, *R. Brown* ..	...	F	C		M	A				T	G
gracilis, *R. Brown* ...	...	...	...	...		A				T	G
satureioides, *R. Brown*...	...	...	S			A	N	Y	L	T	G

Teucrium, Linne.

sessiliflorum, *Bentham* ...	...	...		W	M		N	Y	L		
integrifolium, *F. v. Mueller*	...	F									
corymbosum, *R. Brown*	...	...	S	W			N				G
racemosum, *R. Brown* ...	...	F	C	S	W	M	A	N	Y	L	

Ajuga, Linne (1737).

australis, *R. Brown* ...	...	...	S		M	A	N			K		G

Microcorys, R. Brown (1810).

Macrediana, *F. v. Mueller*	...	F									

Westringia, Smith (1797).

rigida, *R. Brown*				W	M	A	N	Y	L	K	T		
Dampieri, *R. Brown*				W					L				

Lycopus, Linne.

australis, *R. Brown*					M	A					T	G	

Plectranthus, L'Heritier (1785).

parviflorus, *Willdenow*			F										

Prunella, Linne.

vulgaris, *Linne*						A						G	

Scutellaria, Linne.

humilis, *R. Brown*										K			

Prostanthera, Labillardiere (1806).

lasiantha, *Labillardiere*												G	
rotundifolia, *R. Brown*											T		
striatiflora, *F. v. Mueller* ...	F	C	S	W									
Wilkieana, *F. v. Mueller* ...	F												
eurybioides, *F. v. Mueller*					A								
spinosa, *F. v. Mueller*			S						L	K	T		
Behriana, *Schlechtendal*					A						T		
Baxteri, *Cunningham*				W									
ringens, *Bentham*	F												
coccinea, *F. v. Mueller*...					M	A		Y	L	K	T		
chlorantha, *F. v. Mueller*						A		Y	L	K			
calycina, *F. v. Mueller*									L				

LENTIBULARINEAE.

Utricularia, Linne (1737).

flexuosa, *Vahl*												G	
dichotoma, *Labillardiere* ... ... A ... ... K T G													
lateriflora, *R. Brown* ... ... G													

Polypompholyx, Lehmann (1844).

tenella, *Lehmann* ... ... A ... ... K ... G													

OROBANCHEAE.

Orobanche, Linne.

australiana, *F. v. Mueller* ... C S W ... A ... Y L													

SCROPHULARINEAE.

Mimulus, Linne (1741).

gracilis, *R. Brown* ... ... G													
repens, *R. Brown* ... ... M A N ... L K													
prostratus, *Bentham* ... ... F C													

Mazus, Loureiro (1790).

pumilio, *R. Brown*												G

Buechnera, Linne (1737).

linearis, *R. Brown*	F											

Limosella, Linne.

aquatica, *Linne*			S		M	A	N		L	K		G
Curdieana, *F. v. Mueller*			S	W	M							

Peplidium, Delile (1813).

humifusum, *Delile*	F											
Muelleri, *Bentham*		C										

Glossostigma, Arnott (1836).

Drummondii, *Bentham*					M							
elatinoides, *Bentham*					M							

Euphrasia, Linne.

Brownii, *F. v. Mueller*				W		A	N	Y	L	K	T	G
scabra, *R. Brown*						A			L			G

Stemodia, Linne (1759).

Morgania, *F. v. Mueller*	F	C	S		M	A						
viscosa, *Roxburgh*	F											
pedicellaris, *F. v. Mueller*	F											

Gratiola, Linne.

pedunculata, *R. Brown*					M							
Peruviana, *Linne*					M	A				K		G

Veronica, Linne.

decorosa, *F. v. Mueller*			S				N					
Derwentia, *Andrews*						A				K		G
gracilis, *R. Brown*						A	N					G
distans, *R. Brown*						A			L	K	T	
calycina, *R. Brown*								Y		K		G
peregrina, *Linne*						A	N					G

BIGNONIACEAE.

Tecoma, Jussieu (1789).

australis, *R. Brown*	F											

ACANTHACEAE.

Justicia, Linne (1737).

procumbens, *Linne*	F	C	S									
Bonneyana, *F. v. Mueller*					M							
Kempeana, *F. v. Mueller*	F											

Ruellia, Linne.

australis, *R. Brown*		C			M							
primulacea, *F. v. Mueller*	F	C										

PEDALINEAE.

Josephinia, Ventenat (1804).

Eugeniae, *F. v. Mueller* ... C

VERBENACEAE.

Verbena, Linne.

officinalis, *Linne* ... ... M A T G
macrostachya, *F. v. Mueller* ... F C

Newcastlia, F. v. Mueller (1857).

cladotricha, *F. v. Mueller* ... F
spodiotricha, *F. v. Mueller* ... F C
cephalantha, *F. v. Mueller* ... F
bracteosa, *F. v. Mueller* ... F
Dixoni, *F. v. Mueller & Tate* ... ... M N

Dicrastylis, Drummond & Harvey (1855).

ochrotricha, *F. v. Mueller* ... F
Gilesii, *F. v. Mueller* ... ... F
Doranii, *F. v. Mueller* ... ... F
Beveridgei, *F. v. Mueller* ... F W
Lewellini, *F. v. Mueller* ... F

Clerodendrum, Burmann (1737).

floribundum, *R. Brown*... ... F

Spartothamnus, Cunningham (1830).

teucriiflorus, *F. v. Mueller* ... F
puberulus, *F. v. Mueller* ... F

Avicennia, Linne (1737).

officinalis, *Linne* ... ... A N Y L

MYOPORINEAE.

Myoporum, Banks & Solander (1786).

montanum, *R. Brown* ... ... F C S M
insulare, *R. Brown* ... ... A N Y L K T G
viscosum, *R. Brown* ... ... A N Y K G
deserti, *Cunningham* ... ... S W M N Y
humile, *R. Brown* ... ... W M A Y L K G
brevipes, *Bentham* C
platycarpum, *R. Brown* ... ... S W M A N Y T

Eremophila, R. Brown (1810).

Dalyana, *F. v. Mueller*... ... C
scoparia, *F. v. Mueller*... ... C S W M N T
Delisserii, *F. v. Mueller* ... ... W
crassifolia, *F. v. Mueller* L
Behriana, *F. v. Mueller* ... ... A Y L K
Weldii, *F. v. Mueller* ... ... W
Christophori, *F. v. Mueller* ... F
densifolia, *F. v. Mueller* ...

gibbosifolia, *F. v. Mueller*	...	...	...	...	A			L		T
divaricata, *F. v. Mueller*	...	...	...	M						T
polyclada, *F. v. Mueller*	...	C		M						
Goodwinii, *F. v. Mueller*	...	F	C							
Elderi, *F. v. Mueller* ...	...	F	S							
Willsii, *F. v. Mueller* ...	...	F								
santalina, *F. v. Mueller*	...	...	S							
longifolia, *F. v. Mueller*	...	F	C	S	W	M	N	Y		
Freelingii, *F. v. Mueller*	...	F	C	S						
bignoniiflora, *F. v. Mueller*	...	F	C			M				T
MacDonneli, *F. v. Mueller*	...	F	C	S	W					
Bowmani, *F. v. Mueller*	...		C							
rotundifolia, *F. v. Mueller*	...	F	C							
leucophylla, *Bentham* ...	...	F								
Paisleyi, *F. v. Mueller* ...	...	...		W						
Sturtii, *R. Brown* ...	...	F	C							
exilifolia, *F. v. Mueller*	...	F								
Mitchelli, *Bentham* ...	...	F								
Gibsoni, *F. v. Mueller* ...	...	F								
Berryi, *F. v. Mueller* ..	...	...		W						
Clarkei, *F. v. Mueller* ...	...	F								
Gilesii, *F. v. Mueller* ...	...	F	C							
Hughesii, *F v. Mueller*	...	F								
oppositifolia, *R. Brown*	...	...	S	W		N				
Latrobei, *F. v. Mueller*...	...	F	C	S	W					
Brownii, *F. v. Mueller* ...	...	F	C	S	W	M		Y	K	T
Duttonii, *F. v. Mueller*...	...		C	S						
Maculata, *F. v. Mueller*	...	F	C	S	W	M				
denticulata, *F. v. Mueller*	...		...		W					
latifolia, *F. v. Mueller* ...	...		C	S	W	M				
alternifolia, *R. Brown* ...	...	F		S	W	M	N			

CONIFERAE.

Callitris, Ventenat (1808).

verrucosa, *R. Brown* ...	...	F	S	M	A	N	Y	L	K	T
cupressiformis, *Ventenat*	...	...	...	...	A				K	

CYCADEAE.

Encephalartos, Lehmann, (1834).

MacDonnelli, *F. v. Mueller* ... F

HYDROCHARIDEAE.

Ottelia, Persoon (1805).

ovalifolia, *Richard*	...	...	...	...	M	A		K	G

Vallisneria, Linne (1753).

spiralis, *Linne* ...	...	...	...	..	M	G

Blyxa, Noronha (1806).

Roxburghii, *Richard* C

Hydrilla, Richard (1811).

verticillata, *Caspary* ... ... M

Halophila, DuPetit-Thouars (1806).

ovalis, *Hooker* ... ...A Y L K G

ORCHIDEAE.

Dipodium, R. Brown (1810).

punctatum, *R. Brown* ... ...A G

Cymbidium, Swartz (1799).

canaliculatum, *R. Brown* ... C

Thelymitra, Forster (1776)

ixioides, *Swartz* ... ...A G
longifolia, *Forster* ... ...A N Y K G
parviflora, *R. Brown* ... ...A
aristata, *Lindley* ... ...A L G
grandiflora, *Fitzgerald* ... ...A
fuscolutea, *R. Brown* ... ...A L
luteocilium, *Fitzgerald* ... ...A
urnalis, *Fitzgerald* ... ...A
flexuosa, *Endlicher* ... ...A K
antennifera, *Hooker* ... ...A Y K T G
carnea, *R. Brown* ... ...A Y
rubra, *Fitzgerald* ... ...A G

Calochilus, R. Brown (1810).

Robertsoni, *Bentham* ... ...A G

Diuris, Smith (1798).

punctata, *Smith* ... ... G
palustris, *Lindley* ... ...A Y L T G
maculata, *Smith* ... ...
pedunculata, *R. Brown* ... ...A Y G
sulphurea, *R. Brown* ... ...A K G
longifolia, *R. Brown* ... ...A L K G

Orthoceras, R. Brown (1810).

strictum, *R. Brown* ... ...A

Cryptostylis, R. Brown (1810).

longifolia, *R. Brown* ... ... G

Prasophyllum, R. Brown (1810).

elatum, *R. Brown* ... ...A Y K G
australe, *R. Brown* ... ... G
fuscum, *R. Brown* ... ...A Y L
patens, *R. Brown* ... ...A Y G
despectans, *Hooker* ... ...A
nigricans, *R. Brown* L

Spiranthes, L. C. Richard (1818).

australis, *Lindley* ... ... G

Microtis, R. Brown (1810).

porrifolia, *R. Brown*	...	...	...	...	...	A	N	Y	L	K	T	G
minutiflora, *F. v. Mueller*	...	...	...	...	...	A						G

Corysanthes, R. Brown (1810).

pruinosa, *Cunningham*	...	...	...	...	...	A				K		G

Pterostylis, R. Brown (1810).

concinna, *R. Brown*	...	...	...	...	...	A						
nana, *R. Brown* ...	...	...	...	W						K		G
nutans, *R. Brown*	...	...	...	...	...		...		...	K		G
pedunculata, *R. Brown*		...	...	...	...	A						
curta, *R. Brown*...	...	...	...	...	...	A						
cucullata, *R. Brown*	...	...	...	...	...	A						G
praecox, *R. Brown*	...	...	...	...	...		...		...	K		
reflexa, *R. Brown*	...	...	...	...	...	A		Y				
obtusa, *B. Brown*	...	...										
barbata, *Lindley*	...	...	...	...	...	A		Y	L	K		
mutica, *R. Brown*	...	...	...	W				Y	L			G
rufa, *R. Brown* ...	...	...	...	S	W	A		Y				
longifolia, *R. Brown*	...	...	...	...	...	A			L			G
vittata, *Lindley*...	...	...	...	...	...	A		Y		K		

Acianthus, R. Brown (1810).

caudatus, *R. Brown*	...	...	...	...	...		...		...	K		
exsertus, *R. Brown*	...	...	...	...	...	A		Y				

Cyrtostylis, R. Brown (1810).

reniformis, *R. Brown*	...	...	...	...	...	A		Y	L	K		G

Glossodia, R. Brown (1810).

major, *R. Brown*	...	...	..	...	...	A		Y				G

Lyperanthus, R. Brown (1810).

nigricans, *R. Brown*	...	...	...	...	...	A		Y		K		

Eriochilus, R. Brown (1810).

autumnalis *R. Brown*	...	...	...	...	...	A		Y		K		G
fimbriatus, *F. v. Mueller*		...	...	...	...	A						

Caladenia, R. Brown (1810).

Cairnsiana, *F. v. Mueller*		...	...	...	...	A						
reticulata, *Fitzgerald*	...	...	...	...	...	A						
toxochila, *Tate* ...	...	...	...	W								
tentaculata, *Tate*	...	...	...	W								
Menziesii, *R. Brown*	...	...	...	...	...	A						G
filamentosa, *R. Brown*	...	...	...	...	...		...		...	K		G
dilatata, *R. Brown*	...	...	...	...	...	A		Y	L	K	T	G
Patersoni, *R. Brown*	...	...	...	...	...	A	N	Y	L			G
leptochila, *Fitzgerald*	...	...	...	...	...	A	N					
latifolia, *R. Brown*	...	...	...	...	...	A		Y	L	K		G
coerulea, *R. Brown*	...	...	...	...	...	A						
carnea, *R. Brown*	...	...	...	...	...	A		Y		K		G
deformis, *R. Brown*	...	...	...	...	...	A		Y	L	K	T	G

IRIDEAE.

Patersonia, R. Brown (1807).

glauca, *R. Brown* ... ... A K G
longiscapa, *Sweet* ... ... A T G

Sisyrinchium, Linne (1737).

cyaneum, *Lindley* ... ... A K G

AMARYLLIDEAE.

Hypoxis, Linne (1759).

hygrometrica, *Labillardiere* ... ... G
glabella, *R. Brown* ... ... A L T G
pusilla, *Hooker* ... ... W M A N Y L

Crinum, Linne (1737).

angustifolium *R. Brown* ... F
flaccidum, *Herbert* ... ... C S
pedunculatum, *R. Brown* ... ... M

Calostemma, R. Brown (1810).

purpureum, *R. Brown* ... ... A N Y
luteum, *Sims* ... ... C M

LILACEAE.

Burchardia, R. Brown (1810).

umbellata, *R. Brown* ... ... A Y L K G

Wurmbea, Thunberg (1781).

dioica, *F. v. Mueller* ... ... F C S M A N Y L K G

Xerotes, R. Brown (1810).

longifolia, *R. Brown* ... ... A T G
dura, *F. v. Mueller* ... ... S A N Y
Brownii, *F. v. Mueller* ... ... A G
effusa, *Lindley* ... ... W M A Y G
micrantha, *Endlich.* ... ... A L
Thunbergii, *F. v. Mueller* ... ... A
glauca, *R. Brown* ... ... W A Y L T G
elongata, *Bentham* ... ... G
leucocephala, *R. Brown* ... F W M A Y
juncea, *F. v. Mueller* ... ... A L T

Dianella, Lamarck (1780).

revoluta, *R. Brown* ... ... W M A N Y G
laevis, *R. Brown* ... ... A K G

Bulbine, Linne (1737).

bulbosa, *Haworth* ... ... A N Y L G
semibarbata, *Haworth* ... ... C S W M A N Y L K T G

Caesia, R. Brown (1810).

vittata, *R. Brown* ... ... A Y G
parviflora, *R. Brown* ... ... A

Arthropodium, R. Brown (1810).

paniculatum, *R. Brown*	...	...	...	...	...	...	...			...		G
minus, *R. Brown*	...	...	...	...	...	...	Y	L				
strictum, *R. Brown*	...	...	...	S		A	N	Y		K	T	G
fimbriatum, *R. Brown*	...	...	...	...	...	A			L	K		

Thysanotus, R. Brown (1810).

dichotomus, *R. Brown*	...	...	F			A			L	K		G
tuberosus, *R. Brown*	...	...	F	S		A				K	T	G
exasperatus, *F. v. Mueller*	...	...		S				Y				
Baueri, *R. Brown*	...	...	...		W	M	A	Y				G
Patersoni, *R. Brown*	...	...	...	...	...	...	A	N	Y	L	K	T	G
exiliflorus, *F. v. Mueller*	...	F	C									

Tricoryne, R. Brown (1810).

elatior, *R. Brown*	...	...	C			A			L			G

Chamaescilla, F. v. Mueller (1870).

corymbosa, *F. v. Mueller*	...	...	...	...	...	A		Y	L	K		G

Laxmannia, R. Brown (1810).

sessiliflora, *Decaisne*	...	...	...	...	...	A				K	T	G

Calectasia, R. Brown (1810).

cyanea, *R. Brown*	...	...	...	...	...	...	...				T	G

Corynotheca, F. v. Mueller (1870).

lateriflora, *F. v. Mueller*	...	F			M							

Xanthorrhoea, Smith (1798).

quadrangulata, *F. v. Mueller*	...	...	...	...	A					K	T	G
Tateana, *F. v. Mueller*	...	...	...	...	A				L	K		
minor, *R. Brown*	...	...	...	...	...	...	...	...			...	G
semiplana, *F. v. Mueller*	...	...	S		A	N		L			T	G

XYRIDEAE.

Xyris, Linne (1737).

operculata, *Labillardiere*	...	...	...	...	A							
gracilis, *R. Brown*	...	...	...	...	...	...	...	...			...	G

COMMELINEAE.

Commelina, Linne.

ensifolia, *R. Brown*	...	...	F									

ALISMACEAE.

Damasonium, Jussieu.

australe, *Salisbury*	...	...	...	...	M	A						

JUNCACEAE.

Luzula, DeCandolle (1805).

campestris, *DeCandolle*	...	...	...	...	A	N			L	K		G

Juncus, Linne.

planifolius, *R. Brown* ...	...	C				A					T	G
caespititius, *Meyer* ...	...	...	...		...	A	N			K		G
bufonius, *Linne*	...	...	S		M	A	N	Y	L	K	T	G
homalocaulis, *F. v. Mueller* ...	...	...	...		...		...	...	...		...	G
pallidus, *R. Brown* ...	...	...	S		M	A	N	Y	L	K	T	G
pauciflorus, *R. Brown* ...	...	...	...		...	A				K		G
communis, *Meyer* ...	...	...	S	W	M	A	N	Y	L		T	G
prismatocarpus, *R. Brown*	...	...	S		M	A	N					G
maritimus, *Lamarck* ...	...	...	...		...	A			L	K		

PALMAE.

Livistona, R. Brown (1810).

Mariae, *F. v. Mueller* ...	...	F										

TYPHACEAE.

Typha, Linne.

angustifolia, *Linne* ...	...	F		S		M	A	N		L	K	T	G

FLUVIALES.

Triglochin, Linne.

centrocarpa, *Hooker* ...	...	C	S	W	M	A		Y		K		G
mucronata, *R. Brown* ...	...	...	...		...	A			L	K	T	G
striata, *Ruiz & Pavon* ...	...	...	...		M	A	N		L	K	T	G
procera, *R. Brown* ...	...	...	...		M	A				K		G

Potamogeton, Linne.

Tepperi, *Bennett* ...	...	...	S		M	A	N		L	K	T	G
tenuicaulis, *F. v. Mueller*	...											
crispus, *Linne* ...	...	...	...		M							
ochreatus, *Raoul*	...	...	...		...	A				K		
acutifolius, *Link*	...	...	...		M							
pectinatus, *Linne*	...	...	...		...	A			L	K		

Posidonia, Koenig (1806).

australis, *Hooker* ...	...	...	...		...	A		Y				

Ruppia, Linne (1735).

maritima, *Linne*... ...	...	...	...		...	A			L	K	T	G

Zostera, Linne (1747).

nana, *Mertens* ...	...	...	...		...	A		Y				G
Tasmanica, *Mertens*	...	...	...		...	A						

Lepilaena, Drummond (1855).

Preissii, *F. v. Mueller* ...	...	C				A			L	K	T	G
australis, *Drummond* ...	...	...	...		...		...		...		T	

Cymodocea, Koenig (1806).

antarctica, *Endlicher* ...	...	...	...		...	A		Y	L			

Naias, Linne (1735).

tenuifolia, *R Brown* ... ... M
major, *Allioni* ... ... F

LEMNACEAE.

Lemna, Linna (1735).

trisulca, *Linne* ... ... M K G
minor, *Linne* ... ... M K G
oligorrhiza, *Kurz* ... ... T

Wolffia, Horkel (1839).

Michelii, *Schleiden* ... ... M G

RESTIACEAE.

Trithuria, J. Hooker (1860).

submersa, *Hooker* ... ... M K

Aphelia, R. Brown (1810).

gracilis, *Sonder* ... ... A K G
pumilio, *F. v. Mueller* ... ... A K G

Centrolepis, Labillardiere (1804).

polygyna, *Hieron* ... ... M L K G
glabra, *F. v. Mueller* ... ... M
aristata, *Roem. & Schult.* ... ... S M A Y L K T G
fascicularis, *Labillardiere* ... ... A G
strigosa, *Roem. & Schult.* ... ... S A N L K G

Lepyrodia, R. Brown (1810).

Muelleri, *Bentham* ... ... G

Restio, Linne (1767).

complanatus, *R. Brown* ... ... G
tetraphyllus, *Labillardiere* ... ... G

Leptocarpus, R. Brown (1810).

tenax, *R. Brown* ... ... A K G
Brownii, *Hooker* ... ... A L G

Calostrophus, Labillardiere (1806).

lateriflorus, *F. v. Mueller* ... ... A G
fastigiatus, *F. v. Mueller* ... ... A K G

Lepidobolus, Nees (1846).

drapetocoleus, *F. v. Mueller* ... ... A G

CYPERACEAE.

Lepidospora, F. v. Mueller (1875).

tenuissima, *F. v. Mueller* ... ... A G

Kyllingia, Rottboell (1773).

monocephala, *Rottboell*					M							
intermedia, *R. Brown*						A						

Cyperus, Linne.

eragrostis, *Vahl*		C				A						G
tenellus, *Linne*						A						
gracilis, *R. Brown*		C										
pygmaeus, *Rottboell*		C										
squarrosus, *Linne*		C										
difformis, *Linne*		C			M							
trinervis, *R. Brown*					M							
vaginatus, *R. Brown*	F	C	S		M	A	N		L		T	
holoschoenus, *R. Brown*	F											
Gilesii, *Bentham*		C										
fulvus, *R. Brown*		C										
alterniflorus, *R. Brown*			S	W								
Iria, *Linne*		C										
diphyllus, *Retzius*		C										
subulatus, *R. Brown*	F	C										
rotundus, *Linne*	F	C										
lucidus, *R. Brown*					M	A						
exaltatus, *Retzius*			S		M							

Schoenus, Linne (1737).

capillaris, *F. v. Mueller*										K		G
aphyllus, *Boeckeler*					M							
brevifolius, *R. Brown*						A						G
apogon, *Röm. & Schult.*						A	N	Y	L	K		G
axillaris, *Poiret*						A						
sculptus, *Boeckeler*									L	K		
fluitans, *Hooker*										K		
sphaerocephalus, *Poiret*												G
nitens, *Poiret*						A		Y	L	K	T	G
deformis, *Poiret*									L			
Tepperi, *F. v. Mueller*				W		A		Y	L	K		
discifer, *Tate*										K		

Fimbristylis, Vahl (1806).

communis, *Kunth*			S		M							
velata, *R. Brown*		C			M							
ferruginea, *Vahl*	F	C										
barbata, *Bentham*		C										
Neilsoni, *F. v. Mueller*					M							

Heleocharis, R. Brown (1810).

sphacelata, *R. Brown*			S			A	N			K		G
acuta, *R. Brown*			S		M	A	N		L	K	T	G
multicaulis, *Smith*			S			A	N			K		G
acicularis, *R. Brown*					M							

Scirpus, Linne.

pungens, *Vahl*					M	A	N		L			G
maritimus, *Linne*					M	A						
lacustris, *Linne*		C	S		M	A	N					G
litoralis, *Schrader*	F		S			A	N					

Isolepis, R. Brown.

fluitans, *R. Brown*					...	A				K		G
setacea, *R. Brown*					...	A				K		
riparia, *R. Brown*					M	A	N	Y	L	K		G
cartilaginea, *R. Brown*			C	S	M	A	N	Y	L	K		G
inundata, *R. Brown*				S	M	A	N			K		G
supina, *R. Brown*					M							
nodosa, *R. Brown*				S	M	A	N	Y	L	K		G

Lipocarpha, R. Brown (1818).

monocephala, *R. Brown*					M							

Fuirena, Rottboell (1818).

glomerata, *Lamarck*			F									

Carex, Linne.

inversa, *R. Brown*					...	A						G
chlorantha, *R. Brown*					...	A						
tereticaulis, *F. v. Mueller*			S			A	N		L	K	T	
paniculata, *Linne*					...	A				K		G
caespitosa, *R. Brown*				S		A	N					G
pumila, *Thunberg*					...	A	N					G
breviculmis, *R. Brown*					...	A						G
Gunniana, *Boott*				S		A						G
pseudocyperus, *Linne*					...	A				K		G

Caustis, R. Brown (1810).

pentandra, *R. Brown*					...	A				K		G

Cladium, P. Browne (1756).

mariscus, *R. Brown*					...	A						G
articulatum, *R. Brown*				S		A						G
glomeratum, *R. Brown*					...	A						G
tetraquetrum, *Hooker*					...	A				K		
schoenoides, *R. Brown*					...	A			L	K	T	G
filum, *R. Brown*					...	A		Y	L	K		G
Gunnii, *Hooker*					...	A						
junceum, *R. Brown*				S		A	N		L	K		G
trifidum, *F. v. Mueller*					...	A						
radula, *R. Brown*					...	A						G
psittacorum, *F v. Mueller*					...	A						G
lanigerum, *R. Brown*					...	A		Y	L			
deustum, *R. Brown*					...	A		Y	L	K	T	

Lepidosperma, Labillardiere (1804).

longitudinale, *Labillardiere*					...			...		...		G
exaltatum, *R. Brown*					...			...		...		G
gladiatum, *Labillardiere*					...	A		Y	L	K	T	G
elatius, *Labillardiere*					...	A						
concavum, *R. Brown*					...	A						
viscidum, *R. Brown*				S	W	A		Y	L	K		G
laterale, *R. Brown*					M	A						G
congestum, *R. Brown*					...		...		L			
globosum, *Labillardiere*					...		...		...		...	G
lineare, *R. Brown*					...	A				K		

semiteres, *F. v. Mueller*						A					T	
canescens, *Boeck.*						A					T	G
filiforme, *Labillardiere*						A				K	T	G
carphoides, *F. v. Mueller*						A			L	K	T	G

Chorizandra, R. Brown (1810).

enodis, *Nees*						A		Y	L	K		G

GRAMINEAE.

Setaria, Palisot (1812).

glauca, *Palisot*	F											
macrostachya, *H. B. & K.*	F											
viridis, *Palisot*	F	C	S									

Pennisetum, L. Richard (1805).

refractum, *F. v. Mueller*	F	C										

Panicum, Linne.

coenicolum, *F. v. Mueller*		C	S		M							
divaricatissimum, *R. Brown*	F		S		M	A						
prolutum, *F. v. Mueller*					M	A	N					
effusum, *R. Brown*		C	S	W	M	A	N					G
Mitchelli, *Bentham*		C										
decompositum, *R. Brown*	F	C	S	W								
spinescens, *R. Brown*					M							
Crus-galli, *Linne*					M	A						
adspersum, *Trinius*		C										
pauciflorum, *R. Brown*	F											
leucophaeum, *H. B. K.*	F	C	S	W			N					
argenteum, *R. Brown*	F											
gracile, *R. Brown*			S		M	A						
helopus, *Trinius*		C	S		M							
Gilesii, *Bentham*	F	C										
distachyum, *Linne*	F	C										
reversum, *F. v. Mueller*	F	C	S									

Spinifex, Linne (1767).

paradoxus, *Bentham*	F	C	S									
hirsutus, *Labillardiere*						A		Y	L	K	T	G

Neurachne, R. Brown (1810).

alopecuroides, *R. Brown*	F					A	N	Y	L		T	G
Mitchelliana, *Nees*					M							
Munroi, *F. v. Mueller*				W	M							

Hemarthria, R. Brown (1810).

compressa, *R. Brown*					N	A						

Imperata, Cyrillo (1792).

arundinacea, *Cyrillo*	F					A			L			

Erianthus, L. Richard (1803).

fulvus, *Kunth*	F	C			M							

Andropogon, Linne.

sericeus, *R. Brown*		F	C	S				N						
pertusus, *Willdenow*		F												
annulatus, *Forskael*			C											
punctatus, *Roxburgh*			C	S				N						
exaltatus, *R. Brown*		F	C	S			A	N						
bombycinus, *R. Brown*... ...		F				M	A						T	
gryllus, *Linne*		F												

Anthistiria, Linne, fil. (1779).

ciliata, *Linne*	F	C	S			A	N	Y	L		T	G		
avenacea, *F. v. Mueller* ...	F	C			M									
membranacea, *Lindley*		C												

Eriochloa, Humboldt & Kunth (1815).

polystachya, *Humboldt & Kunth*	F	C	S		M									

Perotis, Aiton (1789).

rara, *R. Brown*	F	C	S											

Tragus, Haller (1768).

racemosus, *Haller*	F	C	S	W	M									

Ehrharta, Thunberg (1779).

stipoides, *Labillardiere*...						A					K		G	

Pappophorum, Schreber (1791).

commune, *F. v. Mueller* ...	F	C	S	W	M	A	N							

Lepturus, R. Brown (1810).

incurvatus, *Trinius*					M	A	N	Y	L	K	T			
cylindricus, *Trinius*						A						G		

Echinopogon, Palisot (1812).

ovatus, *Palisot*						A	N			K		G		

Alopecurus, Linne (1735).

geniculatus, *Linne*			S		M	A						G		

Stipa, Linne (1737).

elegantissima, *Labillardiere*			S	W	M	A		Y						
Tuckeri, *F. v. Mueller*...					M									
teretifolia, *Steudel*							...	Y	L	K				
flavescens, *Labillardiere*						A			L					
Muelleri, *Tate*						A								
setacea, *R. Brown*			S		M		N		L					
semibarbata, *R. Brown*... ...	C					A		Y	L	K	T	G		
pubescens, *R. Brown*			S		M		N							
aristiglumis, *F. v. Mueller*			S		M		N	Y	L	K				
scabra, *Lindley*	F	C	S		M	A		Y				G		

Chloris, Swartz (1788).

pectinata, *Bentham*		C												
acicularis, *Lindley*	F	C	S		M		N							
truncata, *R. Brown*	F		S											
barbata, *Swartz*	F	C												
scariosa, *F. v. Mueller*	F													

Dichelachne, Endlicher (1833).

crinita, *J. Hooker*	...	...	...	S			A	N	Y		K		G
sciurea, *Hooker* ...	...	...	...	...		...	A				K		G

Agrostis, Linne (1735).

scabra, *Willdenow*	...	...	...	...	...		...		...		...		G
venusta, *Trinius*	...	...	...	...	...		...		...		...		G
densa, *F. v. Mueller*	...	...	...	...	...	A							
Solandri, *F. v. Mueller*		...	...	...	M	A	N	Y	L	K	T	G	
quadriseta, *R. Brown*	...	...	...	...	...	A	N			K			
montana, *R. Brown*	...	...	...	...	...	A							

Aristida, Linne (1753).

stipoides, *R. Brown*	...	...	F	C	S								
arenaria, *R. Brown*	...	...	F	C	S		M	A					
leptopoda, *Bentham*	...	...		...		...	M						
Behriana, *F. v. Mueller*		...		...		...	M	A	N	Y		T	
ramosa, *R. Brown*	...	...	F		S								
calycina, *R. Brown*	...	...	F		S								

Amphipogon, R. Brown (1810).

strictus, *R. Brown*	...	...	...		W		A		Y				G

Pentapogon, R. Brown (1810).

Billardieri, *R. Brown*	...	...	...	...		...	A						

Sporobolus, R. Brown (1810).

Virginicus, *Humboldt & Kunth*			C	S		M	A		Y	L	K		G
Indicus, *R. Brown*	...	...	F										
Lindleyi, *Bentham*	...	...	F	C	S	W							
actinocladus, *F. v. Mueller*	...	F	C		W								

Cynodon, L. Richard (1805).

Dactylon, *Richard*	...	...	...	...		M	A						G
convergens, *F. v. Mueller*	...		C										
ciliaris, *Bentham*	...	...	C										

Aira, Linne (1737).

caespitosa, *Linne*	...	...	...	...	...		...		...		...		G

Eriachne, R. Brown (1810).

aristidea, *F. v. Mueller*...		...		C									
ovata, *Nees* ...	...	...		C									
pallida, *F. v. Mueller* ...		...	F										
scleranthoides, *F. v. Mueller* ...			F			W							
mucronata, *R. Brown* ...		...	F										
obtusa, *R. Brown*	...	...	...		...	M							

Triraphis, R. Brown (1810).

mollis, *R. Brown*	...	...	F	C	S	W	M						

Danthonia, DeCandolle (1805).

bipartita, *F. v. Mueller*...		...	...	...		M							
carphoides, *F. v. Mueller*		...	...	...		M		N					
penicillata, *F. v. Mueller*		...	...	S	W		A	N	Y	L	K		G
nervosa, *Hooker*...	...	...	...	S		M	A	N	Y		K		G

Astrebla, F. v. Mueller (1876).

pectinata, *F. v. Mueller* ... F C S
triticoides, *F. v. Mueller* ... C

Agropyron, Gaertner (1770).

scabrum, *Palisot* ... ... M A N Y K T G

Elytrophorus, Palisot (1812).

articulatus, *Palisot* ... ... C M

Arundo, Linne.

Phragmites, *Linne* ... ... F M A N L T G

Bromus, Linne (1735).

arenarius, *Labillardiere* ... F S W M A N Y L K T G

Festuca, Linne.

duriuscula, *Linne* ... ... A N

Diplachne, Palisot (1812).

loliiformis, *F. v. Mueller* ... F C S
Muelleri, *Bentham* C
fusca, *Palisot* ... ... C M

Schedonorus, Palisot (1812).

litoralis, *Palisot* ... ... S W M A N L K T

Distichlis, Rafinesque (1819).

maritima, *Rafinesque* ... ... A N Y K T G

Eleusine, Gaertner (1788).

cruciata, *Lamarck* ... ... F C S M
digitata, *Sprengel* ... ... F

Triodia, R. Brown (1810).

Mitchelli, *Bentham* ... ... F
pungens, *R. Brown* ... ... F
irritans, *R. Brown* ... ... F C S W M A N Y

Eragrostis, Palisot (1812).

tenella, *Palisot* ... ... F C
trichophylla, *Bentham* ... ... C S W
leptocarpa, *Bentham* ... ... C S
pilosa, *Palisot* ... ... M G
diandra, *Steudel* ... ... M A
Brownii, *Nees* ... ... F S W M A L T G
concinna, *Steudel* ... ... F C
speciosa, *Steudel* C
laniflora, *Bentham* ... ... C S
chaetophylla, *Steudel* ... ... C S M
eriopoda, *Bentham* ... ... M
lacunaria, *F. v. Mueller* ... ... M
falcata, *Gaudichaud* ... ... C M

Poa, Linne (1737).

Billardieri, *Steudel*	...	...	...	...	...	...	...	..	...	G
nodosa, *Nees*	...	...	...	...	M	A	N	L	T	G
caespitosa, *Forster*	...	...	...	S	W	A	N	Y	L	K	T	G
lepida, *F. v. Mueller*	...	...	...	W	M	N	Y	L	K	T
fluitans, *Scopoli*	...	...	...	...	A
Fordeana *F. v. Mueller*	...	...	...	M
syrtica, *F. v. Mueller*	...	...	...	...	A	Y	K	T
ramigera, *F. v. Mueller*	...	C	S	M

LYCOPODIACEAE.

Lycopodium, Linne.

Carolinianum, *Linne*	...	...	...	...	A	
laterale, *R. Brown*	...	...	...	...	A	K
densum, *Labillardiere*	...	...	...	...	A

Selaginella, Palisot (1805).

Preissiana, *Spring*	...	...	...	...	A	K	T	G
uliginosa, *Spring*	...	...	...	...	...	...	...	...	...	G

RHIZOSPERMAE.

Azolla, Lamarck (1783).

pinnata, *R. Brown*	...	...	..	...	M	
filiculoides, *Lamarck*	...	...	..	..	M	G

Marsilea, Linne (1735).

quadrifolia, *Linne*	..	..	F	C	S	M	A	G

Pilularia, Linne.

globulifera, *Linne*	...	...	...	S

FILICES.

Ophioglossum, Linne.

vulgatum, *Linne*	...	...	C	S	W	M	A	Y	K	G

Botrychium, Swartz (1800).

ternatum, *Swartz*	...	...	...	...	...	A

Schizaea, Smith (1791).

fistulosa, *Labillardiere*	...	...	...	...	...	A	K
bifida, *Swartz*	...	...	...	...	...	...	...	...	...	...	G

Gleichenia, Smith (1791).

circinata, *Swartz*	...	...	...	...	...	A

Osmunda, Linne.

barbara, *Thunberg*	...	...	...	...	...	A

Dicksonia, L'Heritier (1788).

Billardieri, *F. v. Mueller*	...	...	...	...	A	G

Lindsaea, Dryander (1791).

linearis, *Swartz* ...	...	...	...	...	...	A							G

Adiantum, Linne.

Æthiopicum, *Linne*	...	...	...	W		A					K		G

Pteris, Linne (1735).

aquilina, *Linne* ...	...	...	...	...	...	A	N		L	K			G
arguta, *Aiton* ...	...	...	...	...	...		...		L				G
incisa, *Thunberg*...	...	...	...	...	...		...		...		...		G

Lomaria, Willdenow (1809).

discolor, *Willdenow*	...	...	...	...	...	A				K			
lanceolata, *Sprengel*	...	...	...	...	...		...		...		...		G
Capensis, *Willdenow*	...	...	...	...	...	A				K			

Asplenium, Linne (1737).

flabellifolium, *Cavanilles*		...	...	...	...	A	N		L				G
furcatum, *Thunberg*	...	...	...	...	...		...		...		...		G
bulbiferum, *Forster*	...	...	...	...	...		...		...		...		G

Aspidium, Swartz (1800).

molle, *Swartz* ...	...	...	...	...	M								
decompositum, *Sprengel*		...	...	...	...		...		...		...		G

Polypodium, Linne.

punctatum, *Thunberg* ...		...	...	...	...		...		...		...		G

Grammitis, Swartz (1800).

Reynoldsii, *F. v. Mueller*		...	F.										
rutaefolia, *R. Brown*	...	...	F	C	S	W		A	N	Y			
leptophylla, *Swartz*	...	...		...		...		A	N			K	

Cheilanthes, Swartz (1806).

tenuifolia, *Swartz*	...	...	F	C	S	W		A	N	Y	L	K	G
vellea, *F. v. Mueller*	...	...	F	C	S	W							
distans, *Braun* ...	...	...		...		W		A	N	Y			
Clelandi, *F. v. Mueller & Tate*				...		W							

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This Flora includes:—

Orders 101, Genera 553, Species 1,935.

Definitions of Four New Species of Australian Plants.

By Professor Ralph Tate, F.L.S., F.G.S., &c.

[Read October 1, 1889.]

Cryptandra scabrida.*

Spyridium scabridum, R.T. coll.

An erect twiggy shrub of about three to four feet high. Leaves linear-oblong, about quarter inch long, somewhat clustered, deeply channelled above, the margins recurved, bluntly notched at the end; upper side scabrous and sparsely hispid; under side with long subappressed hairs. Flower-heads very dense, in compact terminal cymes, surrounded by a few floral bracts much larger and broader than the leaves, densely beset with white woolly hairs.

By the Eleanor River, and at Karatta, on the Stun'sailboom River, Kangaroo Island (*R.T.*, January 24, 1883).

This species is closely related to *C. halmaturina* and *C. bifida*, from which it differs by the shape of the leaves and the nature of the investiture. The differential characters of the three seem to be as follows:—

Leaves cuneate-oblong, lobes short blunt, densely stellately-hairy, underside also with long simple hairs. *halmaturina*

Leaves narrow-cuneate, lobes longer subacute, upper side glabrous or nearly so, underside densely beset with long hairs. *bifida*

Leaves linear-oblong, somewhat clustered, deeply channelled above, bluntly notched at the end; upper side scabrous and sparsely hispid, underside with long subappressed hairs. *scabrida*

Caladenia toxochila.†

A slender slightly-hairy species of about nine inches high; one-, rarely two-,flowered. Leaves oblong-lanceolate, about four inches long.

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* Upper surface of leaves *somewhat rough*.

† *Bow-shaped* lip or labellum.

Sepals and petals brownish-red, with a yellowish or greenish margin. Dorsal sepal erect, narrower than the lateral sepals, which are flat, lanceolate, gradually pointed, and slightly clavate at the tip, with a minute glandular pubescence, and about half an inch long. Petals narrower than the sepals, of about the same length, tapering to a fine point, without any glandular pubescence. Labellum on a long claw, flat, crescent-shaped with a broad triangular apical extension, marked with brown forked veins diverging from the base; the anterior margins fringed with narrow blunt denticles; colour greenish-yellow, the middle lobe dark-brown. Length, quarter inch; breadth, three-eighths of an inch. Calli on long stalks, clustered in the centre and at the base, or obscurely four-rowed. Column much curved, broadly winged in the upper two-thirds, nearly half inch long

Caroona Hill, 45 miles due west of Port Augusta (*Dr. W. L. Cleland*, August, 1889).

This species in its short petals and sepals resembles *C. Cairnsiana* and *C. reticulata*, but differs especially by the shape of the labellum.

Caladenia tentaculata.*

A slender nearly glabrous species from six to twelve inches high; one- or two-flowered.

Sepals and petals pale-brown with a narrow dark-centre, tapering into long filiform points, and densely beset with short reddish glandular hairs; from one and a half to two inches long.

Labellum narrow, ovate-rhomboid, slightly contracted towards the tip, sessile, without lobes, streaked with brown forked lines, anterior margins shortly and bluntly serrate, about quarter of an inch long and one-eighth in width. Calli in two rows extending from the base to about half the length of the labellum, traceable beyond as dark spots. Column very short, winged throughout, slightly curved, under quarter of an inch long.

Caroona Hill, 45 miles due west of Port Augusta (Dr. W. L. Cleland, August, 1889).

In general appearance this new species resembles *C. filamentosa*; but its labellmm is proper to the Section Phlebochilus, from other species of which it is distinguished by its filiform sepals and rhomboid labellum.

In the following synopsis I have set out the leading characters of the species of Section Phlebochilus; of which two inhabit south-west Australia—*C. discoidea*, Lindley, and *C. multiclavia*, Reichenbach; three South Australia, viz., *C. reticulata*, Fitzgerald, *O. tuxochila*, Tate, and *C. tentaculata*, Tate; and *C. Cairnsiana*, F. v. M., is common to the two regions.

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* Having tentacles or feelers in reference to the sepals and petals.

KEY TO THE SPECIES OF CALADENIA (SECT. PHLEBOCHILUS).

Labellum-margin entire.

Calli in two rows; labellum orbicular, shortly stalked; sepals lanceolate shortly acuminate. *Cairnsiana.**

Calli crowded, lower ones connate; labellum broadly ovate or rhomboidal, long-stalked; sepals lanceolate, tapering into long fine points. *multiclavia.*

Labellum-margin ciliated, toothed or serrate.

Labellum ciliate-fringed, broadly ovate or orbicular.

Calli crowded; labellum contracted at the base; sepals subulate-acuminate. *discoidea.*

Calli in four rows; labellum short-stalked; sepals lanceolate, shortly-acuminate. *reticulata.*

Labellum toothed or crenate.

Calli in two rows; labellum narrow ovate-rhomboid, sessile, bluntly serrate; sepals subulate-acuminate. *tentaculata.*

Calli crowded or in four rows; labellum crescent-shaped with a short lanceolate middle lobe, on a long stalk, toothed; sepals narrow-lancoolate. *toxochila.*

Schœnus discifer.†

Dwarf, densely tufted perennial. Leaves radical, linear, erect, flat, longitudinally veined, under two inches long; leaf-sheaths short, membranous, reddish-brown, neither bearded nor pointed. Stem solitary, about one inch; spikelet two and a half to three lines long, solitary, terminal, erect, sessile, ovate-lanceolate, pale-coloured; the erect leafy involucral bract continuing the stem, about one inch long.

Flowers about three in each spikelet, the two lower ones fertile; glumes glossy, straw-coloured, membranous, with a prominent green keel, acute; hypogynous bristles absent; stamens three, as long as the style; style-branches three. Nut ovoid, three-ribbed, smooth, black, with white streaks and blotches, or white mottled with black, raised on a bluntly triangular lamelliform disk.

Wet heath-ground, Central Dudley Peninsula, Kangaroo Island (*R.T.*, November, 1883).

This species belong to the Section Oligostachyæ of Bentham's arrangement in the Fl. Austral., and is related through its hypogynous disk to the leafless *S. minutulus*. In habit it resembles *S. Tepperi*, but is distinguished by its flat and veined leaves, by its two fertile flowers, and by its smooth ovoid disk-bearing nut.

* Since describing *C. cardiochila*, certain discrepancies in the diagnosis of *C. Cairnsiana* given in the Fl. Australiensis have been cleared away by reference to the original description; and it seems probable that the former name is synonymous with the latter.

† *Having a disk.*

Further Notes on Australian Coleoptera, with Descriptions of New Species.

By the Rev. T. Blackburn, B.A.

VI.

[Read October 1, 1889.]

The specimens on which the following notes and descriptions are founded have been recently acquired or determined by me. They are inhabitants of the colony of South Australia, with one exception—a *Novius* from N. S. Wales. As I had the honour of reading a paper last October before this Society on the Australian *Coccinellidæ* (including some new species of *Novius*), it seems convenient to describe the present one here, although isolated from the other species to which this paper relates by its place in the catalogue of *Coleoptera* as well as by its habitat.

CARABIDÆ.

ACROGENYS.

A. australis, sp. nov. Angusta; elongata; sat depressa; crebre (capite minus crebre) sat fortiter punctulata; supra pilis brevibus dense vestita; prothorace canaliculato, quam latiori paullo longiori; elytris postice truncatis, striatis, interstitiis sat planis. Long., $2\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l.

The antennæ are about half as long as the whole insect, and are very robust; all the joints are pubescent, the basal one scarcely half as long as the head, the rest all much shorter, the second shortest. The maxillary palpi are large and stout, with the apical joint elongate-triangular, the labial very small and slender with the apical joint cylindric. On the head an impression runs obliquely forward from either eye; these two impressions are connected by a transverse one in front, and are foveately deepened near their junction with it; from some points of view these deepened portions alone are noticeable, so that the head seems only bifoveate in front. The prothorax scarcely differs from that of *A. hirsuta*, Macl., except in being less strongly rounded in the front part of its sides, so that it is a little narrower in proportion to its length. The apex of the elytra is rotundate-truncate; none of their interstices are carinate. The puncturation of every part is a little less close and less coarse than in *A. hirsuta*.

Though so very much smaller than either of the previously described species of *Acrogenys*, I cannot doubt that this is a

member of the genus. Having only a single example I have not been able to dissect the parts of the head, and in so small an insect it is most difficult to see them clearly without dissection, but as far as I can see they are quite as in *A. hirsuta*. The only structural differences that I observe consist in the more abrupt truncation of the apex of the elytra and the greater bluntness, as far as I can observe it, of the median tooth of the mentum.

Adelaide district; in flood refuse of the Torrens.

DIABATICUS.

The following two species appear to belong to this genus, although its diagnosis (Cist. Ent. II., p. 324) is not very clear, unless one happened to possess a type of the American genus *Pinacodera*, with which it is compared, and unfortunately I have not such type, nor do I know of one in any Australian collection. Moreover, the expression "orbitu post-oculari rotundato-angustato" is obscure, and the sparseness of puncturation on the elytra can hardly be regarded as a generic character. The species before me seem however to be congeneric with *Plochionus australis*, Er., for which the genus was formed, and agree fairly with Bates' diagnosis as far as I can follow it, although I should scarcely call the claws "strongly" denticulated. The genus resembles *Phlœocarabus*, but differs *inter alia* in the shorter and stouter tarsi, smaller eyes, and elytra very much shorter in proportion to the head and prothorax.

[While this memoir has been in the printer's hands I have received from Mr. T. G. Sloane, of Sydney, some remarks on the generic affinities of these and other *Lebiides* on which I had asked his opinion. Mr. Sloane occupies a foremost place among the rising entomologists of Australia, and his residence in Sydney gives him the opportunity of consulting the oldest and best Australian collections; hence, I attribute considerable importance to his determinations. While disclaiming the ability to speak as a specialist on the *Lebiides*, he is disinclined to refer the following two species to *Diabaticus*, but is unable to refer them to any other described genus. As will be seen from my remarks (above) I think it quite possible that Mr. Sloane is right in this matter, but, nevertheless, it seems to me advisable to use the name *Diabaticus* for the present, rather than form a new genus closely allied to *Diabaticus*, especially as I can specify no good structural distinctive character. I think I have described the species under consideration sufficiently in detail to prevent any actual inconvenience arising from my having attributed them to a genus in which they can perhaps hardly maintain a permanent place.

I should add that Mr. Sloane tells me he cannot regard as genuinely pertaining to *Phlœocarabus* the South Australian spe-

cies that I have attributed to that genus, mentioning especially as distinctive of *Phlœocarabus* a much smaller second joint of the antennæ and a more *Xanthophœa*-like head. As Mr. Sloane has seen the insect on which the genus was founded I have no doubt he is right in the matter, but, nevertheless (as I pointed out in a paper read last week before the Linnean Society of N. S. Wales) these South Australian species agree very well with the published characters of *Phlœocarabus*, so that they can hardly be furnished with a new generic name except after a re-characterising of *Phlœocarabus*. Mr. Sloane's courtesy in making these comparisons however enables me to perceive the need of pointing out that my allusion to *Phlœocarabus* above refers to the South Australian species which I have attributed to that genus, and might possibly not apply to the original type.]

D. tumidiceps, sp. nov. Elongatus, capite prothoraceque conjunctis elytris vix brevioribus; glaber; sat nitidus; obscure rufescens, elytris piceo-umbratis, antennis, palpis, pedibus, meso- et metasternis abdomineque, testaceis,-hoc ad latera piceo-maculato; capite pone oculos fortiter dilatato; hoc prothoraceque sparsim subtiliter punctulatis et subtiliter transversim rugatis; elytris sat fortiter striatis, interstitiis vix convexis minus sparsim punctulatis, postice rotundato-truncatis. Long. $3\frac{1}{5}$ l.; lat. 1 l.

Antennæ less than half as long as the whole insect, moderately robust, the second joint shorter than the rest, which are subequal. The head is subparallel, and scarcely narrower than the prothorax, and is longer (from the base to the apex of the labrum) than it is wide, being as wide across the post ocular dilatation as across the eyes; there is a deep impression on either side at the inner front corner of the post ocular dilatation from which a furrow runs forward just within the eye, and curves forward across the head between the antennæ, in front of which the surface of the head is uneven. The prothorax is fully as long as wide, subtruncate in front, with the dorsal channel strong but abbreviated at both ends, the anterior angles quite rounded off, the sides very finely margined, roundly divergent hindward immediately behind the base and then gently convergent and almost straight to the base, which is narrower than the widest part of the segment by about a third part of the width of the latter; the hind angles are subdentiform, with the adjacent surface a little explanate; the anterior curved impression is very strong, the base rather strongly lobed in the middle. The elytra are widest behind the middle, where they are nearly twice as wide as the widest part of the prothorax; there are two large punctures on the third interstice. The mentum is strongly toothed;

the apical joint of the labial palpi is moderately securiform in the male, that of the maxillary being elongate, subcylindric, and truncate at the apex; the tarsi are moderately broad, glabrous, and nitid above, the joints of almost equal width, the fourth somewhat emarginate at the apex.

Port Lincoln; among débris on swampy ground, not common.

D. minor, sp. nov. Sat elongatus; capite prothoraceque conjunctis elytris parum brevioribus; glaber; sat nitidus; rufescens vel testaceo-rufus; capite, elytrorum umbris nonnullis, et sternorum abdominisque maculis nonnullis, piceis vel rufo-piceis; capite obsolete sat sparsim punctulato, pone oculos sat fortiter dilatato; prothorace sat fortiter transversim rugato; elytris subtiliter striatis, interstitiis sat planis, obsolete sparsim punctulatis, postice truncatis. Long., $2\frac{3}{8}$ l.; lat., $\frac{1}{3}$ l. (vix).

Head oval, a little narrower than the prothorax, scarcely so long as wide, and a little wider across the eyes than across the dilated part behind them. There is an obscure impression on either side between the antennæ. Prothorax nearly half again as wide as long, subtruncate in front; the dorsal channel fine, lightly impressed, and abbreviated at both ends; the anterior angles quite rounded off; the sides narrowly margined, moderately rounded and scarcely sinuate behind, but with the hind angles minutely subdentiform, the widest part about half again as wide as the base, which is moderately lobed in the middle, the anterior impression moderately defined. The elytra are about one-fifth again as long as the head and prothorax together, and about one-third again as wide as the prothorax, the widest part being near the apex. The puncturation of their interstices is much feebler than in *D. tumidiceps*.

Port Lincoln, in company with the preceding.

PHORTICOSOMUS.

P. robustus, sp. nov. Piceo-brunneus; antennis palpisque manifeste, pedibus vix, dilutioribus; antice leviter bisinuato, postice quam antice vix latiori, angulis posticis acutis subdentiformibus; elytris postice adlatera sinuatis, fortiter striatis, interstitiis sat convexis. Long., 7 l.; lat., $2\frac{1}{3}$ l.

Head (across the eyes) slightly narrower than the base of the prothorax; the latter half again as wide as its length down the middle, at its widest in front of the middle; the front margin and base of almost equal width, the front margin moderately concave and gently bisinuate; the front angles much rounded, and not at all produced forward as they are in *P. mucronatus*, Blackb.; the central channel moderately impressed, and at both ends much

abbreviated ; the sides strongly sinuated immediately before the hind angles, which are scarcely less dentiform than those of *P. mucronatus ;* the reflexed margin narrow, as in *P. brunneus* (narrower than in *mucronatus*); the surface transversely depressed in front of the disc, as in *brunneus*, Blackb., and with a curved anterior impression, also as in *brunneus*. The sculpture of the elytra is very similar to that of *P. brunneus* and *felix*, Schaum., except that the interstices are more convex.

The already-described species of *Phorticosomus*, neither very much larger nor very much smaller than this, and having the posterior angles of the prothorax sharply rectangular or subdentiform, are *similis*, Blackb. (this is a good deal smaller) and *mucronatus*. Both these have the elytral striæ very much feebler and the interstices flat. *P. mucronatus* also has the clypeus much less rugose, and the sides of the elytra very much more strongly sinuate near the apex.

South Australia ; I am uncertain of the exact locality.

PSELAPHIDÆ.

CTENISTES.

C. Adelaidæ, sp. nov. Rufescens; antennis elongatis; prothorace antice angustato, postice fovea magna impresso; elytris prothorace dimidio longioribus ; oculis sat magnis.

Maris (?) metasterno profunde longitudinaliter sulcato; antennis elytrorum apicem attingentibus, articulis 1-7 conjunctis quam articuli 8-11 conjuncti multo brevioribus, articulis 8-10 gradatim brevioribus, articulo 11° quam 9na et 10ma conjuncti vix breviori, apice oblique truncato. Long, $\frac{2}{3}$ l.

This species is, no doubt, rather close to *C. parvus*, Shp., which it resembles in the long antennæ (reaching the apex of the elytra when set back), the well defined simple fovea of the prothorax and the elytra about half again as long as the prothorax. The antennal joints, however, are very different in their proportions *inter se* ; the 10th joint being much longer than wide, and the 11th barely equal (not to the preceding three together but) to the preceding two. These antennal differences might be sexual, but they are accompanied with certain other distinctions, the eyes in the present species being by no means exceptionally small, and the elytra being rather strongly dilated behind—which seem quite inconsistent with specific identity. From *C. impressus*, Shp., the present species may be known *inter alia* by the prothorax being as long as wide, and scarcely narrower at the base than in the middle, and having a simple fovea, from *C. simplex*, Shp., by its long antennæ and non-transverse prothorax, from *C. vernalis*, King, and *C. Kreusleri*, King, by the very different antennal structure, although it is possibly the previously undes-

cribed sex of the latter (as the size and the antennal structure of the one sex are really the only distinctive characters mentioned in the description of that species), the size of which, however—said to be less than half a line—seems to point to distinctness, and moreover I have another species (mentioned below) which agrees much better with the description.

In flood débris near Adelaide.

C. Kreusleri, King. In flood débris of the Torrens I have taken both sexes of a *Ctenistes*, which I believe to be this species. The distinction between the sexes seems very slight except in respect of the antennæ. The sex that I take to be the male has the apical four joints of the antennæ together equal to the basal seven together, and forming a distinct club in which joints eight-ten are somewhat equal in length, and gradually increase in width, joint eleven being wider still, slightly longer than nine and ten together, and obtusely narrowed at the apex; the second ventral segment is scarcely longer than the following segments together, and bears an obscure impression slightly in front of its apical margin. In the other sex the apical four joints together of the antennæ are considerably shorter than the basal seven together, and are successively thickened, joint 8 being same length as 9, 10 scarcely shorter than the preceding two together, 11 scarcely shorter than the preceding three together; and the second ventral segment is decidedly longer than the following segments together and has no impression. The whole insect is of a very uniform pale castaneous colour, it is closely and rather coarsely asperate-punctulate, and somewhat closely clothed with short, crisp, whitish hairs. The prothoracic fovea appears somewhat forked in front. The antennæ are short (reaching back to about the middle of the elytra), and the eyes are much smaller than in *C. Adelaidæ*.

C. tenebricosus, sp. nov. (? female). ♀ Brunneo-niger; antennis sat brevibus; prothorace antice angustato, postice fovea magna impresso; elytris prothorace dimidio longioribus; oculis sat parvis. Long., $\frac{2}{3}$ l. (vix).

This species differs from all yet described as Australian of the genus, by its uniform blackish colour. It is more finely and sparsely punctured than *C. Kreusleri (?)*, and therefore more nitid; like that species it is clothed with short, crisp, whitish hairs. The prothorax is scarcely so long as wide, with a deep posterior fovea not at all forked in front, the general surface of the segment being even. The elytra are considerably narrower at the shoulders than behind. The antennæ scarcely differ in structure from those of the specimen which I regard as the female of *C. Kreusleri*.

Port Lincoln; in moss,

ARTICERUS.

A. asper, sp. nov. Ferrugineus, antennis pedisbusque testaceis, supra (abdominis basi nitida sparsim punctulata transversim profunde excavata excepta) subopacus, crebre aspere punctulatus; capite prothorace elytrisque obscure pubescentibus; antennis valde depressis, quam latiores parum longioribus, supra parte dimidia basali longitudinaliter impressa; capite quam antennæ vix longiori; prothorace fortiter transverso haud foveolato. Long., 1 l. (vix).

The antennæ are not much longer than wide on their flattened face, both sides of which are strongly rounded in outline, but the middle of the curve is on the outer side, a little nearer to the apex than on the inner side.

Of the other described species having antennæ impressed above, *Pascoeus*, Shp., has the prothorax not transverse; *auriflavus*, Schauf., has the inner margin of the antennæ straight, and *brevipes*, Shp., has the elytra punctured only indistinctly.

A single specimen was taken by me in flood refuse near Adelaide.

BYRRHIDÆ.

BYRRHUS.

I see no good structural character to prevent the following species being considered a true *Byrrhus*, although it should be noted that I have not been able to devote a specimen to dissection. It differs from the typical forms of the genus in having the body somewhat densely and evenly bristling with long erect hairs, and having the incrassation of the antennæ commencing only at the seventh joint. These latter consist of 11 joints, and are inserted, as in *Byrrhus*; the head is retracted in repose, but in such fashion that the eyes and labrum are visible (the former only in part); all the tarsi are laid stiffly back in repose against their tibiæ, which, however, are channelled by no means deeply for their reception. The apical joint of the maxillary palpi is somewhat more elongate and conic than in most species of *Byrrhus*.

B. Torrensensis, sp. nov. Oblongo-ovatus; nitidus; crebrius subtilius punctulatus; pilis longis nigris erectis sat dense vestitus; supra nigro-æneus, prothorace obscure viridi; subtus rufus vel piceo-rufus, antennis (clava picea excepta), palpis, labro, pedibusque, testaceis. Long., 1-1⅓ l.; lat., ⅔-1 l.

The antennæ, if set back, would about reach the base of the prothorax; joint 1 is stout, and about as long as 3, 2 is very short, 3 nearly as long as 4, 5, and 6 together, the latter three subequal, and scarcely longer than wide, 7-11 forming a well-defined club.

Two specimens occurred to me in flood-refuse on the banks of the River Torrens.

ELATERIDÆ.

TETRALOBUS.

T. Fortnumi, Hope. I have lately received a male example of this genus taken by Mr. Read near Lake Eyre, which seems to be quite distinct from any species previously seen by me. It is broad in proportion to its length (long,, 13 l. ; lat., 4 l.), and its prothorax, instead of being more or less canaliculate down the middle, has a very faintly *raised* shining dorsal line. But the character on which I rely for specific distinctness consists in the structure of the antennæ in the male, the branches of which are much shorter than in any other *Tetralobus* I have seen, the longest of them being no longer than the distance between the antennæ at their base. The antennæ, moreover, are very short as a whole, reaching when laid back not further than to the front of the basal quarter of the prothorax. The colour of the insect is dark chestnut, the legs and antennæ (except the basal joint) being paler. The prothorax is (across the hind angles) exactly as wide as it is long down the middle. The elytra are very distinctly punctulate-striate, but the puncturation becomes feebler, and the striæ are obsolete near the apex. The interstices are feebly convex in the front half, and are punctured more sparingly than in any other *Tetralobus* that I have seen. The prothorax has the usual fovea on either side of the middle line near the front strongly marked.

As there are several descriptions of species of *Tetralobus* which scarcely mention more than generic characters it is very likely that this insect has already received a name, and it appears to me not at all unlikely to be *T. Fortnumi*, Hope. The only difficulties in so regarding it are that *T. Fortnumi* should be a somewhat *narrower* insect, and is said to have the longitudinal line of the prothorax "parum impressa;" whereas in the specimen before me it is "haud impressa." This latter character, however, is probably variable (judging from other species of *Tetralobus*), and as it seems that *T. Fortnumi* is quite incapable of certain identification, and the measurements given by its author may be a trifle inexact, I think it will be well to assign the name to this insect, at any rate until some fresh evidence to the contrary may be forthcoming.

T. Manglesi, Hope. There are before me specimens of an insect belonging to my own collection and to those of the Adelaide Museum and of the Adelaide University Museum, taken in various parts of South Australia, which, I think, may be regarded as this species. Like most of its congeners, the species varies greatly in size, the smallest examples being long., 12 l., lat., 3½ l. ; the largest long., 17 l., lat., 5 l. It is accordingly one of the widest of the genus in

proportion to its length. It is also characterised by the elytra being (not gradually narrowed from the base to the apex, but) slightly narrowed immediately behind the base, and then lightly dilated again, so that they are very slightly wider just before the apex than at any other part. The prothorax is just barely wider across the hind angles than its length down the middle, and immediately in front of the middle it is in both sexes almost or quite as wide as across the hind angles, which are only very slightly produced hindward or outward, the sides being gently sinuate. It is very closely and quite rugulosely punctulate in front, less so behind. Its dorsal channel is extremely feeble in the examples before me, and the lateral foveæ are only slightly marked. The front angles are more or less feeble and rounded. The elytra are distinctly striate, the striæ irregularly punctulate, the external ones having stronger and larger punctures than those near the suture, all the striæ and their punctures becoming more or less obsolete towards the apex. Each apex is separately and feebly rounded, the suture ending in a very small spine. The interstices are more or less closely punctured, more strongly in the male than the female. The sides of the prosternum are very strongly and sparingly punctured—(this is a highly distinctive character, and does not seem to vary). The antennæ of the male are shorter than in the large common South Australian species (*T. Australasiæ*, or possibly *Murrayi* if the two are really distinct), and the individual branches of the same are also shorter, though they are very distinctly longer than the distance between the bases of the antennæ. The tarsi also are notably shorter, especially in the male.

From *T. Fortnumi* (*vide* "supra") it differs chiefly in being much less attenuate behind, with the prothorax less rugulose dorsally; the sides of the prosternum much less closely punctulate; the branches of the antennæ in the male considerably longer, and the apical spines of the elytra much feebler.

TENEBRIONIDÆ.

LEPISPILUS.

L. rotundicollis, sp. nov. Oblongus; convexus; piceus; maculatim flavo-pubescens; prothoracis lateribus sinuatis, latitudine paulo ante medium quam trans basin haud minore. Long., 8 l.; lat., $3\frac{3}{5}$ l.

Differs from *L. sulcicollis*, Boisd., in the form of the prothorax, which is (by measurement) very nearly twice as wide as long (as 13 to 7 in the example before me), with the front about two-thirds the width of the base, the sides strongly convex in outline immediately behind the front, and from the middle to the base almost as strongly concave, so that the greatest divergence is at

the base and at a point a little in front of the middle. The closely punctulate depressions on the elytra bearing yellow pubescence are very shallow and very large, and are very irregularly placed, so that the nitid interspaces form an ill-defined and extremely open network, none of them appearing as continuous longitudinal costæ, even that nearest to the suture being more or less interrupted. It is not improbable, however, that there may be some variation in this respect if in some examples the depressed spaces happen to fall more into longitudinal lines. The average area of these closely punctured depressed spaces is about equal to that of the eye as seen from above, but in places two or three of them almost coalesce, so as to form what on a casual glance looks like a very large space indeed.

A single example in the South Australian Museum is ticketed "C. A." (Central Australia). Other specimens similarly ticketed seem to be from the southern part of the tropical region.

MELOIDÆ.

ZONITIS.

Z. nigro-ænea, Fairm., var. (?) *A*. Nigra; clypeo antice obscure piceo; elytris cœruleis, crassissime rugulose punctulatis, interstitiis haud lævigatis. Long., 6 l.; lat., 1⅛ l.

The antennæ are two-thirds the length of the body; joint 1 is slightly longer than 4, 2 scarcely half as long as 1, and two-thirds the length of 3. The head is equal in length to the prothorax, and also to the first four joints taken together of the antennæ; the distance from eye to eye is rather more than the length of the basal joint of the antennæ, or about one-third the length of the head. The labrum is nearly as long as the basal joint of the antennæ, ciliated in front and deeply channelled down the middle, its surface shiny, with a few strong punctures. The clypeus is truncate in front, its hind suture strongly angulated; its surface is shining and only obscurely punctulate, a deep furrow crossing it near its base, its length about equal to that of the labrum. The hind part of the head is strongly and somewhat rugosely punctulate, and almost truncate behind. The prothorax down the middle is barely longer than its greatest width, which is slightly behind the middle; its base is about a quarter again as wide as the base of the head; the width of its front is about one-third of its base, from which the sides diverge sinuously not quite to the middle, where they are strongly rounded, and thence converge sinuously to the front; the front part of the suface is a little depressed; from this depressed space a very strong central channel runs back to the base, and on either side of the channel there is a large deep fovea on the disc. The scutellum is nitid, and very sparsely, but not finely, punctulate. The elytra are

extremely coarsely foveolate-punctulate, the instertices quite confused, with no tendency to a linear arrangement, and bearing confused punctures and wrinkles. In the male the basal three ventral segments are carinate down the middle, and the fourth is strongly and widely emarginate at the apex. The underside is rather closely (least closely on the hind body), squamosely, and finely punctured, and is densely clothed with black pubescence, the upper surface being glabrous.

Seems to be near *Z. nigro-œnea*, Fairm., but is larger, with the hind body of the male carinate (not "longitudinally impressed"), and with the scutellum and the elytral interstices punctulate.

If M. Fairemaire's description of *Z. nigro-œnea* can be relied upon, the insect described above is probably a distinct species. But unfortunately that author's "Revision des Zonitis d'Australie" contains errors (perhaps of the printer) which render it unsafe to give new names to species that seem closely allied to those that are described in it. In the description of *Z. indigacea (e.g.)* we read of the antennæ "articulo 2° tertio paulo longiore," but further on *indigacea* is distinguished from *nigro-œnea* by "the second joint notably shorter than the third."

Port Lincoln.

Z. Andersoni, sp. nov. ♀ Nigra, capite (labro excepto) rufo, elytris (apice excepta) testaceis, prothorace pedibusque brunneo-piceis; capite antice minus producto; elytris crebre subtilius punctulatis, obsolete costatis. Long., 7½ l.; lat., 2⅕ l.

The antennæ are about half as long as the whole body; joint 1 is rather short (little more than half as long as the distance between the eyes), 2 scarcely longer, 3 slightly longer still, 4 still longer (nearly half again as long as 1). The head is triangular, scarcely longer than the width of its base, which is gently arched hindward, its length about equal to that of the basal four joints of the antennæ together. The labrum is about as long as the clypeus (the two together being less than half as long as the rest of the head), its front portion declivous, its front margin ciliated, its surface feebly and sparingly punctulate and hairy, without any furrow. The hinder part of the clypeus is flat and horizontal, with a defined margin or ridge, the portion in front being declivous; the hind suture is feebly arched, its surface obscurely punctulate (most strongly on the ridge). The hinder part of the head is punctured rather strongly in front, very obscurely behind, with a feeble central longitudinal furrow running forward for a short distance from the base. The prothorax is scarcely wider than long, its front margin about a third as wide as the base and as the hind margin of the head; its sides diverge slightly and

scarcely sinuously to about the middle, where they are feebly rounded, and whence they converge bisinuately to the front; its surface is very finely and sparsely punctured, the front portion depressed; there is an interrupted and rather feeble channel down the middle of the hinder half; the base is very gently arched hindward; scutellum smooth behind, punctured in front. The elytra are closely, evenly, and rather finely punctulate, and bear (besides the raised suture) distinct traces of three or four costæ, which almost reach the apex. The metasternum is faintly punctulate, and bears a short, close, erect pile; the ventral segments are nitid, glabrous, and almost lævigate.

The bright red head, dark red-brown shining prothorax, and testaceous semi-opaque elytra, with their apex black, will render this species easy to recognise.

Allied to *Z. tricolor*, LeG., but (apart from colour) differing in its much shorter head, differently shaped clypeus and labrum, prothorax very much narrower in front, &c.

Port Lincoln; taken by Mr. J. Anderson.

Z. brevicornis, sp. nov. Rufa; antennis, palpis, mandibulis apice, femoribus anticis antice in medio, tibiis (basi exceptis), tarsis, macula in capite, maculis in prothorace 2, metasterno (episternis exceptis) et abdominis parte, piceo-nigris; elytris cœruleis, crebre subtilius (postice crassius) punctulatis; capite antice minus producto; prothorace antice minus angustato. Long., 5 l.; lat., $1\frac{1}{5}$ l.

The antennæ are about half as long as the whole body; joint 1 is short (scarcely as long as half the distance from eye to eye); 2, shorter still; 3 and 4 subequal, each of them equal to the basal joint. The head is not very triangular in shape, its length and breadth about equal, its length a little greater than that of the basal four antennal joints together. The labrum is scarcely so long as the clypeus (the two together not quite half as long as the rest of the head), its surface devoid of a dorsal furrow, strongly punctulate, its front ciliated. The clypeus is strongly punctulate, its hind suture strongly arched. The surface of the hind part of the head is punctulate strongly in front, and gradually less strongly hindward, and bears between the eyes a large piceous blotch, which is slightly protuberant and lævigate in the middle; the hind margin of the head is almost truncate. The prothorax is very slightly shorter than the head, very slightly wider than long, and equal in width to the hind margin of the head; its front margin (which is emarginate) is nearly half as wide as its base; its sides are gently and somewhat evenly arched, their greatest divergence being in front of the middle; its surface is strongly and very sparingly punctured, with some feeble indica-

tion of a dorsal channel a little in front of the base, and with a distinct round piceous discal blotch on either side a little in front of the middle. The elytra are closely subrugosely and rather finely punctured, the punctures much mixed up with a system of reticular wrinkling. The upper surface (saving some hairs on the labrum) is glabrous. The underside is distinctly, though rather lightly and squamosely, punctured; the metasternum bears a short erect closely-set pile. The claws are red. The middle tibiæ are strongly, almost angularly, bent (perhaps in the male only). The hind body is piceous, but bears a yellow patch (successively larger on each segment from the base) on either side of each segment. In the male the ventral segments are carinate all down the middle.

This species should fall, I think, into M. Fairemaire's first division of the genus, and will be the only species therein yet described having unicolorous blue elytra; its short thick antennæ also will distinguish it. A very old and faded example in the South Australian Museum seems to be identical, although the black spots on the head and prothorax are wanting.

Port Lincoln.

Z. cyanipennis, Pasc. The description of this species occupies four lines in the "Journal of Entomology." True, it is accompanied by an uncoloured figure, but, unfortunately, the figure appears to have been taken from a specimen with its head tucked down among the sterna, and gives little information beyond what the brief description furnishes; indeed, it rather presents a contradiction, for whereas the size given after the description is 6 l., the indicator in the plate gives $4\frac{3}{4}$ l., M. Fairemaire has provided a fuller description of an insect in his collection which he alleges (without specifying his authority) to be *cyanipennis*, Pasc., and gives its length as $8\frac{1}{2}$ mm., which means, I suppose, $4\frac{1}{4}$ l. I think M. Fairemaire's identification is possibly incorrect, both because he describes the colour (which appears to me remarkably constant in the metallic Zonites) differently from Mr. Pascoe, calling the elytra "blue-green" instead of "dark indigo-blue;" and because he says that the humeral calli are almost lævigate, which (if my identification of *Z. cyanipennis* is correct) certainly is not the case. Mr. Pascoe makes no allusion to the puncturation of any part of *cyanipennis*, so this important character gives no assistance. I have before me two specimens from Melbourne (the locality of the original type) coloured as *cyanipennis* is said to be, except in having the mesothoracic epimera yellow (of the length 6 l.). One of these—a female—agrees with Mr. Pascoe's figure in the shape of the elytra at the apex. The other (length, 4 l.) is a male, and seems perfectly identical with the larger specimen, except in respect of what appear to be sexual characters, viz.,

the antennæ are more slender (three-fifths the length of the whole body); the elytra are more narrowed, and are separately rounded at the apex, and the ventral segments are different, the basal three being compressed into a keel down the middle, and the fourth triangularly depressed in the middle.

The head in the insect which I take to be *cyanipennis*, Pasc., is nearly twice as long as its width across the base; the labrum is quite as long as wide, is depressed down the middle, and bears a few strong setiferous punctures. I do not find any distinct separation between the hinder part of the head and anything that can be called a clypeus. The middle of a straight line drawn from the front of the labrum to the hind margin of the head would fall decidedly in front of the base of the antennæ. The antennæ are broken in the female example before me; joint 1 is unusually long (equal to the basal joint of the front tarsi, and much more than half as long as the distance from eye to eye); 2, half as long as 1; 3 and 4 successively increasing in length; but even 4 distinctly shorter than 1. The prothorax is scarcely longer than the head, is a little (to the eye it looks a good deal) longer than its greatest width, and is at its front margin rather more than a third the width of its base. The elytra are scarcely punctulate, but appear shagreened with fine vermiculate rugulosity somewhat as in *Z. rustica*.

Z. rustica, sp. nov. Rufa; antennis, palpis, mandibulis, femoribus apice, tibiis, tarsis, capite toto, metasterno (episternis exceptis), et abdominis segmentis primis 3, nigris; elytris cœruleis, crebre subtilius punctulatis, capite antice producto gradatim angustato; prothorace fortius crebrius punctulato, antice sat fortiter angustato. Long., $4\frac{1}{4}$ l.; lat., $1\frac{3}{5}$ l.

The antennæ scarcely exceed the length of half the body; joint 1 is short (less than half as long as the distance from eye to eye), 2 scarcely half as long as 1, 3 slightly shorter than 1, 4 slightly shorter than 3. The head is very slightly longer than its width across the eyes, with its hind margin convex hindward; it is gradually narrowed forward so as to be rather pointed in front, its width across the base of the mandibles is little less than half its width across the eyes; its whole surface, including the labrum, is evenly, strongly, and rather closely punctulate, except that the puncturation becomes finer and feebler near the hind margin; the labrum is rather strongly transverse, is clothed with long hairs, and bears a deep central fovea, much abbreviated in front. The prothorax is of the same length as the head, slightly longer than its greatest width, its front margin about half as wide as its base, its sides somewhat evenly rounded (scarcely perceptibly sinuate both in front of,

and behind, the middle), its greatest width (which is at the middle) scarcely exceeding the width of the head across the eyes, its surface evenly, somewhat strongly, and rather closely punctulate, with obscure traces of the middle part of a longitudinal dorsal furrow. The elytra on close examination are seen to be finely punctulate, but their readily noticeable sculpture consists of a confused system of wrinkling, making them appear finely shagreened, or coarsely coriaceous. To specify the degree of this sculpture by comparison with a familiar species, I may say that the general effect of the sculpture is a little less rough and strong than that on the elytra of *Z. bicolor*, Le G. The upper surface is glabrous or nearly so, the underside and legs densely clothed with short hairs. The claws are red, the ventral segments are coarsely, squamosely, and rather closely punctulate.

South Australia.

Z. Murrayi, sp. nov. ♂ Rufo-testacea; labro, palpis, antennis (basi picescenti excepta), femorum apice, tibiis, tarsis, metasterno (episternis exceptis), et abdominis segmentis basalibus 5 (5i apice rufo excepto), nigris; elytris læte cœruleis; capite nonnullis exemplis antice infuscato; hoc fortiter minus crebre punctulato antice minus producto minus angustato; prothorace canaliculato vix perspicue punctulato, antice sat fortiter angustato; elytris minus subtiliter vermiculato-punctulatis. Long., 5 l.; lat., $1\frac{3}{5}$ l.

The antennæ are about three fifths of the length of the whole body; joint 1 is piriform and strongly curved, in some examples testaceous, decidedly shorter than in *Z. cyanipennis*, scarcely longer than half the distance between the eyes, about as long as in *Z. rustica*, but much more strongly curved, joint 2 about one-third shorter, 3 equal to 1, 4 scarcely so long as 3. The head from the front of the labrum to the base is scarcely longer than its greatest width, the front part nearly parallel-sided; the middle of a line joining the front of the labrum, and the base of the head would fall between the insertions of the antennæ; the labrum is transverse and sulcate down the middle; the clypeal suture is quite undefined. The prothorax scarcely differs from that of *Z. cyanipennis*. The sculpture of the elytra is on the same plan as in *Z. cyanipennis* and *Z. rustica*, but is stronger, coarser, and less close than in either of them. The specimens before me appear to be all males, but (as usual in this genus) the soft hind body has become so much distorted in drying that its shape is not the same in any two. The first four or five ventral segments are compressed into a keel, which, however, does not always run down the exact middle line; the fifth is very feebly concave all across at the apex. The

ventral segments are very nitid, strongly and sparsely punctulate, and only thinly pubescent. The middle tibiæ are very strongly compressed and strongly curved; much more so than in *Z. cyanipennis*. The head is quite four-fifths as wide as the widest part of the prothorax.

Evidently must stand near to *Z. cyanipennis*, from which it differs in the yellow head nearly as wide as the prothorax, more coarsely sculptured elytra, much more nitid, strongly punctulate, and less pubescent ventral segments, &c.

Murray Bridge (South Australia); taken by Mr. Tepper.

Z. gloriosa, sp. nov. Piceo-brunnea obscure rufescens, elytris antice viridibus postice purpureo-violaceis; capite antice valde producto subtilius crebrius (disco lævi excepto) punctulato; prothorace vix perspicue canaliculato, leviter nec crebre vix subtiliter punctulato, antice rotundato-angustato; elytris subtiliter sat crebre nec rugulose punctulato. Long., 7 l.; lat., 3 l. (vix).

Considerably dilated behind. The apical part of the antennæ has been broken off the example before me; joint 1 equals 3, and is rather longer than 2 and shorter than 4. The head is more than one-third again as long as at the base it is wide, the front part parallel-sided; the middle of a line joining the base of the head and front of the labrum would fall considerably in front of the antennæ; the labrum is nearly as long as wide, its surface punctulate and longitudinally sulcate. The prothorax is slightly wider than long; its base is truncate, from which the sides diverge very slightly in nearly straight lines to immediately in front of the middle, where they are rounded, and whence they converge in a strong curve to the front, which is about half as wide as the base, but viewed from above the sides seem to pass into the front in a continuous curve; the surface bears no inequalities, except a barely discernible longitudinal furrow, which is abbreviated slightly in front. The puncturation of the elytra is considerably finer and less close than in *Z. tricolor*, Le Guill., and is not at all rugulose. The prothorax is slightly wider than the head, and scarcely half as wide as the widest part of the elytra. An obscure costa runs obliquely from close within the shoulder to the middle of the disc of the elytra.

Seems to resemble *Z. splendida*, Fairm., but that species is said to have a short triangular head, and the prothorax lœvigate. The present species has the head exceptionally elongate—the anterior part being almost absolutely parallel-sided—and the prothorax distinctly punctured. It appears to me structurally nearer to *Z. cyanipennis*, Pasc., than to any other previously described species.

Port Lincoln district; taken by Mr. J. Anderson.

COCCINELLIDÆ.

NOVIUS.

N. ruber, sp. nov. Breviter ovalis; sat nitidus; pubescens; sanguineo-ruber, subtus distincte, supra vix perspicue, hic illic infuscatus; tarsis picesentibus; capite prothoraceque vix perspicue, elytris crebre subtilius, punctulatis. Long., $1\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

Much like *N. bellus*, Blackb., in form and sculpture, but decidedly larger, and very differently coloured. The whole upper surface is of a shining bright-red colour, almost like sealing-wax. On close inspection a little vague infuscation can be discerned running down the side of each elytron a little within the margin in the front half, and occupying the neighbourhood of the inner apical angle.

N. cardinalis, Muls., is a still larger species with the head black and the prothorax and elytra bearing conspicuous black markings. *N. sanguinolentus*, Muls., has the head, prothorax, and scutellum black. The upper surface of *N. Lindi*, Blackb., is entirely black, except a large red spot on each elytron. *N. cardinalis*, Muls., and *bellus*, Blackb., agree in having both prothorax and elytra red, with black markings; but the pattern of either is very different from that of the other.

Sent to me by Mr. T. G. Sloane; taken by him, I believe, at Mulwala, N.S.W.

ERRATUM.

Tr. Roy. Soc., 1887, p. 224, lines 7, 24, 28, 29, and 33, for "*Lindi*" read "*Sharpi*."

Notes on the Geographical Distribution of Australian Characeæ.

By Baron Sir F. von Mueller, F.R.S., &c.

[Read August 6, 1889]

The following brief indications of the geographic range of various Australian Characeæ, which are additional to what is recorded in vol. xi. of my Fragm. Phytogr., Austral., pt. II., pp. 43-44, are from the researches of Dr. O. Nordstedt, chiefly through material communicated from the Melbourne Phytologic Museum :—

Chara contraria, *Al. Br.*:—Victoria; South Australia (Lake Bonney, *Miss Wehl;* Kangaroo Island, *O. Tepper).*

Chara coronata: — Victoria; Queensland; South Australia (Pidinga, *W. Tietkins).*

Chara dichopitys :—Victoria and New South Wales.

Chara fragilis, *Desv.* :—W. Australia; New South Wales; Queensland.

Chara gymnopitys, *Al. Br.* :—S. Australia (Kangaroo Island, *O. Tepper);* V.; N.S.W.; N.A.

Chara gymnopus :—W.A.; T., V.; N.S.W.; Q.; N.A.

Chara leptopitys, *Al. Br.* :—S.A. (Lake Bonney, *Miss Wehl);* Victoria.

Chara macropogon, *Al. Br.* :—W.A.; Q.; S.A. (Kangaroo Island, *O. Tepper).*

Chara Muelleri, *Al. Br.* :—Victoria.

Chara submollusca, *Nordstedt* (n. sp.) :—Queensland.

Nitella conglobata :—W.A.; V.; N.S.W.; Q.; N.A.

Nitella cristata :—S.A. (Tatiara-country, *C. Walter);* T.; N.S.W.; Q.

Nitella diffusa :—Victoria; New South Wales.

Nitella gracilis :—S. Australia (Murray River, *F. v. M);* Victoria.

Nitella Gunnii, *Al. Br.* :—V.; N.S.W.; Q.

Nitella hyalina :—W.A.; V.; Q.; N.A.

Nitella interrupta :—S.A.; T.; V.; N.S.W.; Q.

Nitella leptostachys, *Al. Br.* :—S.A. (among Todeas above the cataract of Mount Lofty, *F. v. M.*, 1848).

Nitella microphylla, *Al. Br.* :—W.A.; T.

Nitella myriotricha, *Al. Br.* :—S.A. (Murray River).

Nitella polyglochin :—Queensland.

Nitella Sonderi, *Al. Br.* :—N.S.W.; N.A.

Nitella Tasmanica, *F. v. M.* :—Victoria; Queensland.

Notes on Australian Fungi.

Collated by J. G. O. Tepper, F.L.S.

[Read August 6th, 1889].

List of Fungi, New or Rare for South Australia.

The following species were collected by Mr. J. G. O. Tepper, and named by Prof. P. Andrea Saccardo, of Padua, through the kindness of Dr. F. Ludwig, Germany :—

Uromyces Tepperianus, *Sacc., sp. n.* On *Acacia salicina.* It attacks the younger branches, causing fusiform swellings several inches in length, and in the middle two to four times the diameter of the branch. The bark bursts finally in several places, and the brown spores thickly cover the surface of the wounds. The branches, and finally the shrub, so attacked die after one to three years, or support life in a stunted form to an indefinite extent.
Black Hill, N.E. of Adelaide ; Sandy Cr., Callington. October to November, 1887.

Dimerosporium Ludwigianum, *Sacc., sp. n.* On *Lagenophora Billardieri,* forming raised pustules on the leaves ; spores ferruginous. Common in open woody hill districts.
Clarendon, Angaston, &c., November, 1887.

Capnodium elongatum, *B. & D.* It is distributed over the leaves of some species of Acacia.
Williamstown, October, 1888.

Chætomium comatum *(Tode), Fr.* A black rust upon straw, Norwood, 1888.

Septoria Bromi, *Sacc.* On the leaves of *Kœleria phleoides* (an introduced grass).
Murray Bridge, November 1887.

Heterobotrys paradoxa, *Sacc., gen.* and *sp. n.* Dr. Ludwig states that it was found on all specimens of *Bertya rotundifolia,* a Kangaroo Island plant.

The following remarks are taken from letters and publications by Dr. Ludwig, in the "Bot. Central Blatt," No. 11, 1888 :—"The leaves of this small shrub are rough, of a dull dark green, and densely covered by minute hairlets of a peculiar structure. The

stalk or erect portion is from 300 to 350 u in length, and 30 to 50 u thick, and from its apex radiates a whorl of ten to twenty bristly, one-celled branches, of about the same length, but in average only three to five u thick (excepting the much stouter base), which are placed at right angles to the stalk." "In the stalk of these stellar hairs appears to be the principal seat of the fungus, for it is frequently so much invaded by it that very little of the original contents remains. Arriving at the summit the fungal threads grow spirally around the bristle-like stellar branches, frequently occupying all in the whorl, and twisting around them as closely and regularly as 'beans or hops around the poles' When developed luxuriously the threads branch and anastomose profusely, producing parcels of brown accumulated cells, which impart a still darker tint to the leaves and other parts. All that remains finally are small heaps of globular spores of five to six u diameter, adhering to some of the bristles. The spiral twist of this microscopic climber is from left to right almost unexceptionally; occasionally some of the bristles themselves are so twisted, or several together, but this may be due to the screw-like growth of the fungus." "The mycelium likewise invades the leaf structure, frequently filling the cells and destroying the epidermis, when it imparts to these parts a blackish tint, which is owing to the colour of the threads and spores. In this character it exhibits affinity to *Fumago salicina*, and probably also to *Pleospora herbraum*."

STEREUM HIRSUTUM, *Fr.*, *var. aurantium.* A pale orange-coloured woody fungus on old bark of the Sheaoak, *Casuarina quadrivalvis.*

Mount Lofty Ranges, August, 1887. A well-known species, but the locality and host are probably new.

STEREUM AMŒNUM (*Leo.*), *Sacc.*

Mount Lofty Ranges. The species appears to be new for the province.

POLYSTICTIS ORNAMOMEUS, *Sacc.* On rotten timber of Stringy-bark, *Eucalyptus obliqua.*

Mount Lofty Ranges, August, 1887. This species is new for the province.

POLYSTICTIS SANGUINEUS (*L.*), *Fr.*

Lake Eyre, Pandappa, August 2, 1887.

TRAMETES HISPIDULA, *Berk.* An orange-coloured widely looped fungus, living on the ground or very rotten timber in the sandy scrub.

Williamstown, October, 1888. Species new for South Australia.

CYPHELLA POLYCEPHALA, *Sacc., sp. nov.* On dry twigs of *Senecio hypoleucus*, a suffruticose composite plant common on the hillsides near Adelaide.

The specimen sent was taken from a shrub cultivated in my garden at Norwood, August, 1887.

PANUS LATERITIUS, *Sacc., sp. nov.* Upon rotten wood of *Eucalyptus corynocalyx*, or sugar gum.

Karatta, Kangaroo Island, November, 1886.

NUMMULARIA PUSILLA, *Sacc., sp. nov.* It forms raised round pustules of intense black colour, and thickly studding rotten stems of *Bursaria spinosa*, which give the appearance as if the sticks were carbonised by a bush fire.

LIST OF AUSTRALIAN USTILAGINÆ, WITH DESCRIPTION OF AND REMARKS ABOUT A NEW SOUTH AUSTRALIAN SPECIES.

The Ustilaginæ, or Smuts, form an important section of fungi (CONIOMYCETES), inasmuch as many of them prove destructive to grasses and cereals useful or indispensable to man.

The following is a list of those known from Australia according to Dr. F. Ludwig, which is remarkable for its paucity. Of the 400 species known, 86 occur in Germany alone, hence the above-named specialist directs the attention of Australians to this section as offering a wide field of discovery. I collate Dr. Ludwig's list with Dr. Cooke's from 1880 to show the modifications and additions, distinguishing those of the latter left out from the former by enclosure in brackets, and the additions by an asterisk.

* USTILAGO AUSTRALIS, *Cke.*, in spikelets of *Eriachne*; Trop. Australia.

" (CARBO, *Tulasne*; Queensland).

" MUELLERIANA, *Thuemen*; in seeds of *Juncus planifolius*; V., S.A.

* " FIMBRISTYLIS, *Thuemen*; in ripe seeds of *Fimbristylis*; Trop. Australia.

" MARMORATA, *Berkeley*; upon leaves of *Isolepis inundata*; S.A., V.

" BROMIVORA *(Tul.) Winter*; in flowers of *Triraphis mollis*; S.A., V., N.S.W.

" SEGETUM *(Bull., Ditm.), Winter*; in flowering spikelets of *Avena sativa*; Q.

" SOLIDA, *Berkeley*; upon *Schœnus imberbis*; V., N.S.W.

USTILAGO UTRICULOSA *(Mont., Nees), Winter;* in the flowers of *Polygonum minus;* V., S.A.?

" (EMODENSIS, *Berkeley;* Q.).

" (BULLATA, *Berkeley;* S.A., V., N.S.W.).

" (PILULIFORMIS, *Tulasne;* V.).

* " TEPPERI, *Ludwig, sp. nov.*

Spores powder-like, black, replacing more or less completely the flowering panicle and other parts above the rootstock, form spheroidal or shortly elliptical, diameter=12-17 u; colour, deep brown; epispores papillose to aculeate.

Habitat.—South Australia.

This smut attacks *Amphipogon strictum, Neurachne alopecuroides* and *Danthonia penicillata,* and is at times quite common. It has been observed at Ardrossan (Yorke's Peninsula), Callington, Clarendon, and about Adelaide from about the end of September to December.

CINTRACTEA (USTILAGO) AXICOLA, *Berkeley;* in panicles and fruits of *Cyperus, Fimbristylis,* and *Scirpus;* Queensland.

* DOASSANSIA PUNCTIFORMIS, *Winter;* upon leaves of *Lythrum hyssopifolium;* S.A.?

* THECAPHORA GLOBULIGERA, *Berk. & Br.;* in the glumes of *Leersia hexandra;* N.S.W., Q.

SORASPORIUM MUELLERIANUM, *Thuemen;* in the panicles of *Cladium filum;* V. (S.A.?).

" ERIACHNIS, *Thuemen;* in the spikelets of *Eriachne;* Q.

* CEREBELLA PASPALI, *Cke. & Mass.;* upon *Paspalum scrobiculatum;* Trop. Australia.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1888-89.

ORDINARY MEETING, NOVEMBER 6, 1888.

Prof. RENNIE in the chair.

EXHIBITS.—J. G. O. TEPPER. F.L.S., showed some metamorphic rocks from the ranges between Williamstown and the South Para. J. J. EAST showed geological specimens from the McDonnell Ranges and adjacent parts of Central Australia.

MOTION.—J. G. O. TEPPER, F.L.S., moved, and S. DIXON seconded—"That the recommendations made by the Field Naturalists' Section with regard to the better preservation and protection of the Native Flora and Fauna of South Australia be adopted by the Society." Carried.

RECOMMENDATIONS OF THE FIELD NATURALISTS' SECTION.

That with the view of obtaining the better protection of our Native Fauna and Flora the Government should be asked—

1. To amend the Game Act, 1886 :—
   - *a*. By extending its operation to the whole colony, including islands.
   - *b*. By totally protecting in the State Forests all indigenous animals, save such as are found to be of an injurious character, for whose destruction licenses may be issued by the Conservator of Forests.
   - *c*. By totally protecting, as a general rule, all harmless mammals and insectivorous birds indigenous to the colony.
2. To give due notice to the public every year, either by means of placards or otherwise, of the amount of protection afforded by law to our native animals.
3. To place diagrams, descriptive of the habits of native insectivorous birds and harmless mammals, and to give instruction with regard thereto in the public schools.
4. To vest Government Farm, Belair, and the unsold lands around Mount Crawford in trustees, consisting of representatives of science, horticulture, and labour, for the purposes of National Parks and Preserves for the indigenous Fauna and Flora.

S. DIXON moved, and W. HOWCHIN, F.G.S., seconded—"That the President (Prof. Rennie) be the representative of the Society

on a deputation to the Minister of Education with reference to the instruction of children in matters relating to the native flora and fauna." Carried.

PAPERS.—"The Occurrence of Coal Detritus in the Valley of the Murray," by W. HOWCHIN, F.G.S.

ORDINARY MEETING, DECEMBER 4, 1888.

Prof. RENNIE in the chair.

BALLOT.—John Dennant, F.G.S., was elected a Corresponding Member.

EXHIBITS.—A. ZIETZ showed a collection of native weapons from various parts of the Australian Colonies.

ANNOUNCEMENT.—Prof. TATE, F.G.S., informed the meeting that the Government of South Australia had determined to print and publish from his manuscript a "Handbook of the Flora of South Australia."

PAPERS.—"Notes on some Freshwater Cretaceous Fossils from Central Australia," by Prof. TATE, F.G.S.; "A Revision of the Flora of Kangaroo Island," by Prof. TATE, F.G.S.

ORDINARY MEETING, FEBRUARY 5, 1889.

J. S. LLOYD, Esq., in the chair.

EXHIBITS.—Rev. H. KEMPE forwarded some ants from the River Finke, which were provided with sacs filled with a sweet fluid. D. J. ADCOCK showed what was probably a coccid on a seed-capsule of a eucalypt, from Daly Waters.

PAPERS.—"Foraminifera of the Older Tertiaries of Australia; part. i., Muddy Creek," by W. HOWCHIN, F.G.S. "The Cyclostomata of South Australia," by A. ZIETZ.

ORDINARY MEETING, MARCH 4, 1889.

Prof. RENNIE in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., showed a collection of rare moths, including *Opsirhina*, sp. (?), from Terowie, and *Chærocampa*, sp. nov., from Silverton, and *Pinara cana*; also two new fungi, *Battarea Tepperi* (Ludwig) and *Ustilago Tepperi* (Ludwig). A. ZIETZ showed a new Snake for South Australia, *Furina Ramsayi*, from Hergott Springs.

PAPERS.—"Outcrops of Granatoid Rocks on the Murray Flats, not hitherto mapped," by W. HOWCHIN, F.G.S. "Industrial Applications of Dynamo-Electricity," by C. Umbehaun.

ORDINARY MEETING, APRIL 2, 1889.

Prof. RENNIE in the chair.

EXHIBITS.—D. B. ADAMSON laid on the table some photographs of the moon. A. ZIETZ showed a large specimen of the deaf-adder, 32 in. long. J. G. O. TEPPER, F.L.S., showed some rare fungi found in South Australia. W. RUTT, C.E., showed a specimen of petrified wood from a bed of gypsum in the reservoir at Irrappatonna, 10 miles north of the Peake Creek. Prof. TATE showed a sample of native sulphur found in an auriferous reef near Oakbank containing iron pyrites. W. T. BEDNALL showed a rare moth.

PAPER.—"Geological Structure and Physical Features of Central Australia," by J. J. EAST.

ORDINARY MEETING, MAY 7, 1889.

Prof. RENNIE in the chair.

BALLOT.—Joseph Vardon, J.P., was elected a Fellow.

EXHIBITS.—J. G. O. TEPPER, F.L.S., showed specimens of *Pielus* moths.

DISCUSSION.—On Mr. J. J. East's paper read at the April meeting, in which Mr. Howchin, F.G.S., and Mr. J. Lindsay took part.

ORDINARY MEETING, JUNE 7, 1889.

Dr. WHITTELL in the chair.

BALLOT.—J. C. Fraser was elected a Fellow.

EXHIBITS.—J. G. O. Tepper, F.L.S., showed some new species of *Locustidæ*. A. ZIETZ showed some native implements found near Milang; also some new fishes from the overflow of the borehole at Strangways Springs.

PAPER.—"On some South Australian *Polyzoa*," by P. H. McGillivray, M.R.C.S., F.L.S., &c.

ORDINARY MEETING, JULY 2, 1889.

Prof. RENNIE in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., showed large seeds from Beltana, which might belong to a species of *Cycas*; also a hard species of fungus allied to the *Polypodiæ*, and a liverwort, *Marchantia cephalocypha* (Ludwig); also a small moth from Beltana, probably new, and a large brown-coloured one with bristles, genus and species unknown. A. ZIETZ showed a collection of South Australian *Polyzoa*. Prof. TATE showed specimens

of *Campotropus inflatus*, from Hermansburg, Central Australia, sent by the Rev. H. KEMPE.

PAPERS.—"Plant-Bearing Strata in Central Australia," by Prof. TATE, F.G.S. "Notes on some Rumbling Sounds heard at Gill's Bluff," by F. D. JOHNSON. July 9, 1888, 10.30 p.m.—Rumbling sound like blowing off of steam from a large boiler, lasting about forty seconds. July 22, 7 p.m.—Heard a similar noise. July 30, 10.50 p.m.—Rolling sound from the same quarter as on the previous occasions; lasted about 30 seconds. October 22, 10.30 p.m.—Rolling kind of noise for a few seconds. November 21, 8 p.m.—Slight rumbling sound. This was heard also by Mr. ROSE, a prospector, who got up and questioned some natives camped alongside, who replied, "That one, along a ground." February 14, 1889, 10.40 p.m.—Loud rumbling sound, heard by the men in the camp. April 24, 1889, 6.30 p.m.—Low rumbling sound for half a minute. The evenings were invariably calm and clear, and gave no indications of any atmospheric disturbance.

ORDINARY MEETING, AUGUST 6, 1889.

Prof. RENNIE in the chair.

BALLOT.—P. H. McGillivray was elected a Corresponding Member.

COMMUNICATION.—Prof. RENNIE read a notice giving particulars of the next meeting of the Australasian Association for the Advancement of Science in Melbourne, January 7, 1890.

EXHIBITS.—A. ZIETZ showed a living specimen of *Dromicia concinna*; also a new fish *(Cyttus australis)*; also a rare night lizard *(Nephrurus platyurus)*. J. G. O. TEPPER, F.L.S., showed some locusts from Warrina, sent by Dr. KENNEDY.

PAPERS.—"Notes on *Heterobotrys paradoxa*, found on *Bertya rotundifolia*," by Dr. F. LUDWIG; also by the same, "Notes on some new Australian Ustilaginæ." Both papers on specimens forwarded by J. G. O. TEPPER, F.L.S., who communicated the papers. "Additions to the Australian Characeæ," by BARON v. MUELLER, K.C.M.G.

ORDINARY MEETING, SEPTEMBER 10, 1889.

Prof. TATE in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., a collection of plants from Roebuck Bay, Western Australia. J. J. EAST showed some geological specimens collected by W. T. TIETKINS, F.R.G.S., in Central Australia.

MOTION.—J. G. O. TEPPER, F.L.S., moved, and S. DIXON seconded—"That this Society acquiesces in and supports the

action of the Field Naturalists' Section respecting the permanent dedication of large tracts of land for the conservation of the native flora and fauna, and also general forest culture upon scientific, hygienic, and economic principles." Carried.

PAPERS.—"Notes on a Pentateuchal Roll," by F. W. PENNEFATHER, LL.B., &c. "Notes on certain Pores on the Wings of some Dipterous Insects," by FRAZER S. CRAWFORD.

DR. STIRLING announced that he would shortly submit a full diagnosis of the newly-discovered mammal, referred to in last year's volume of the Transactions, to which he gives the name of *Psammoryctes typhlops*, gen. et spec. nov.

ANNUAL MEETING, OCTOBER 1, 1889.

Prof. RENNIE in the chair.

AUDITOR.—D. J. Adcock was proposed and elected to audit the accounts for the past season.

The annual report and balance-sheet were read, adopted, and ordered to be printed.

The annual reports and balance-sheets of the Field Naturalists' and Microscopical Sections were read and accepted.

ELECTION OF COUNCIL.—The nomination and election of officers for the ensuing year was as follows:—President, E. C. Stirling, M.D.; Vice-Presidents, H. T. Whittell, M.D., and Rev. Thos. Blackburn, B.A.; Hon. Treasurer, W. Rutt, C.E.; Hon. Secretary, W. L. Cleland, M.B.; Members of Council, Prof. Tate, F.G.S., Professor Rennie, D.Sc., D. B. Adamson, Samuel Dixon, W. Howchin, F.G.S., W. B. Poole.

PRESIDENT'S ADDRESS.—Prof. RENNIE, D.Sc., gave an address "On some Recent Advances in Chemical Classification."

PAPERS.—"Additions to South Australian Coleoptera, by Rev. THOMAS BLACKBURN, B.A. "Systematic Census of South Australian Plants," by Prof. TATE, F.G.S. "Gums and Resins of Australian Proteaceæ," by J. H. MAIDEN, F.L.S. "New Species of South Australian Plants," by Prof. TATE, F.G.S.

ANNUAL REPORT.

The Council has the pleasure of reporting that the work of the Society has been carried on successfully during the past year. The following papers have been laid before the Society:—"Notes on some Freshwater Cretaceous Fossils from Central Australia (Lake Eyre)," by Prof. Tate, F.G.S.; "A revision of the Flora of Kangaroo Island," by Prof. Tate, F.G.S.; "Foraminifera of the Older Tertiaries of Australia, Part I., Muddy Creek, Victoria," by W. Howchin, F.G.S.; "The Cyclostomata of South Australia," by A. Zietz; "On some Outcrops of Granitoid Rocks on the Murray Flats, not hitherto mapped," by W. Howchin, F.G.S.; "Industrial Applications of Dynamo-Electricity," by C. Umbehaun; "Geological Structure and Physical Features of Central Australia," by J. J. East; "On some South Australian Polyzoa," by P. H. McGillivray, M.R.C.S., F.L.S.; "Plant-bearing Strata in Central Australia," by Prof. Tate, F.G.S.; "List of Australian Ustilaginæ, with description of a new species," by J. G. O. Tepper, F.L.S.; "Additions to Australian Characeæ," by Baron v. Mueller; "Fragment of a Pentateuchal Roll," by Mr. Pennefather, LL.B.; "Notes on Certain Pores upon the Wings of Dipterous Insects," by F. S. Crawford; "Gums and Resins of Australian Proteaceæ," by J. H. Maiden, F.L.S.; "Notes on *Heterobotrys paradoxa*," by J. G. O. Tepper, F.L.S.; "New Australian Coleoptera," by Thos. Blackburn, B.A.; "Definitions of four New Species of Plants," by Prof. Tate, F.G.S.; "Revised Census of South Australian Plants," by Prof. Tate, F.G.S.

During the year there have been presented to the notice of the Fellows and members many new and interesting exhibits of natural history, chiefly through the instrumentality of Mr. J. G. O. Tepper, F.L.S., and A. Zietz, both of the Adelaide Museum.

His Excellency the Earl of Kintore has consented to be Vice-Patron.

The membership of the Society consists of 94 Fellows, eleven Hon. Fellows, seventeen Corresponding Members, and two Associates. During the year two new Fellows have been elected, and two new Corresponding Members, namely, John Dennant, F.G.S. (Victoria), and P. H. McGillivray, M.R.C.S. (Victoria). No Fellow or member has died during the year, but there have been several resignations from varying causes.

The reports of the two Sections of the Sooiety, namely, the

Field Naturalists' and Microscopical Sections, show continued vitality, and that they are self-supporting. The report of the Sub-Committee of the Field Naturalists' Section on the Preservation of the Native Flora and Fauna is of especial interest and importance, and the efforts being made in this direction should have the hearty co-operation, not only of the members of the Society, but of all lovers and students of Nature. It is to be regretted that so much ignorant apathy has yet to be overcome, but persistence in the end cannot fail to vanquish even that obstacle.

During the year the Library of the Society has continued to be enriched by numerous periodical exchanges and valuable monographs, a list of which appears elsewhere. Some new European exchanges have been authorised during the past year.

It is with great satisfaction that the Council is able to announce that within a few days Prof. Tate's "Handbook on the South Australian Flora" will be published. This is a want that has been long needed; and the appearance of such a work will give a great stimulus to botanical study. It will enable those who hitherto have had to be content with playing the rôle of simple collectors to become botanists; and as a consequence they will become still better collectors, because of their increased scientific knowledge. Even to the fortunate possessors of Bentham's "Flora Australiensis," the new work will be welcome, as it contains descriptions of numerous plants that have been discovered since the publication of that great opus. Prof. Tate's extensive experience as a teacher and a scientific botanist have enabled him to combine qualities not often united, and the valuable effect of these are to be seen in the descriptions of the diagnostic characters of plants.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£ s. d.	£ s. d.	Cr.	£ s. d.	£ s. d.
October 1, 1888.			By Cost of Transactions—		
To Balance		256 18 7	Printing and Binding	95 10 10	
" Subscriptions—Royal Society ..	89 15 6		Illustrating	50 8 0	
Field Naturalists' Section	23 0 0		Editing and Publishing ..	4 1 0	
Microscopical Section ..	7 5 0				149 19 10
		120 0 6	" Salary of Assistant Secretary ..		21 0 0
" Government Grant		136 13 0	" Advertising		4 14 6
" Interest		8 11 2	" Printing, Postage, Stamp Tax, and Stationery		13 17 8
" Sale of Transactions		1 2 6	" Grant to Field Naturalists' Section ..		25 0 0
			" " Microscopical Section ..		7 5 0
			" Library - Binding		7 9 0
			" Balance—Bank of South Australia ..	58 4 2	
			Savings Bank	234 14 8	
			In Hon. Secretary's hands ..	1 0 0	
			In Treasurer's hands ..	0 0 5	
					293 19 3
		£523 5 9			£523 5 9

Audited and found correct,

D. J. ADCOCK, Auditor.

October 1st, 1889.

WALTER RUTT, Hon. Treasurer.

30th September, 1889.

DONATIONS TO THE LIBRARY

For the Year 1888-9.

I.—Transactions, Journals, and Reports.

Presented by the respective Societies, Editors, and Governments.

Baltimore—American Chemical Journal; vol. IX., Nos. 4 to 6; vol. X., Nos. 1 to 6.

——— Johns-Hopkins' University Studies; fifth series, Nos. 8 to 12; seventh series, No. 1.

——— Johns-Hopkins' University Circulars; Nos. 58 to 63, and 65 to 67.

Batavia — Naturrkundig-Tijdschrift voor Nederlandsch-Indie; Achtste Serie, Deel IX.

Belfast (Ireland)—Report and Proceedings of the Belfast Natural History and Philosophical Society for 1887-8.

Belgium—Annales de la Sociètè Belgique; tomes 16 to 22.

Berlin—Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin; 1888; Nos. 21 to 52.

——— Königlich Preussischen Meteorologischen Institut—Instruktion für die Beobachter an den Meteorologischen Stationen II., III., und IV. Ordnung.

——— Ergebnisse der Meteorologischen Beobachtungen im Jahre, 1887.

Bonn—Verhandlungen des Naturhistorischen Vereines der Preussischen Rheinlande, Westfalens und des Reg.-Bezirks, Osnabrück; part 2, 1886; 1887-8; part 1, 1889.

Boston—Memoirs of the Boston Society of Natural History; vol. IV., Nos. 1 to 6.

——— Proceedings of the American Academy of Sciences; part 1, vol. XXII.; part 2, vol. XXIII.

——— Proceedings of the Boston Society of Natural Sciences; vol. XXIII., parts 3 and 4.

Buenos Ayres—Boletin de la Academia Nacional de Ciencias en Cordoba (Republica Argentina); vol. XI., 1888.

California—Bulletin of the Californian Academy of Sciences (San Francisco); vol. II., No. 8.

California—Memoirs of the Californian Academy of Sciences; vol. II., No. 1.

Cambridge (U.S.A.)—Bulletins of the Museum of Comparative Zoology at Harvard College; vol. XIV.; vol. XV.; vol. XVI., Nos. 2 to 5; vol. XVII., Nos. 2 and 3.

Canada—The Canadian Record of Science; vol. III., Nos. 3 to 6 (Montreal).

——— Catalogue of Canadian Plants; part 5.

Cape Town—Transactions of the South African Philosophical Society; vols. I., II.; vol. IV.; vol. V., part 1; 1877-88.

Chili—Verhandlungen des Deutschen Wissenschaften Vereins zu Santiago, 1888.

Connecticut (America)—Transactions of the Meriden Scientific Association; vol. II., 1885-6; vol. III.

Costa-Rica—Anales dei Museo Nacional (San José); vol. I., 1887.

Edinburgh—Proceedings of the Royal Society of Edinburgh, for the years 1883-7.

——— Proceedings of the Royal Physical Society, 1887-8.

Geneva—Compte Rendu des Séances de la Société de Physique et d'Histoire Naturelle de Genève; V., 1889.

Gottingen—Nachrichten von der Königlich Gesellschaft der Wissenschaften und der Georg-Augustus-Universitat zu Göttingen; 1887, Nos. 1 to 21; 1888, Nos. 1 to 17.

Halle—Leopoldina, Amptliches Organ der Kaiserlich Leopoldino-Carolineschen Deutchen Akademie der Naturforscher; hefte 22 and 23 (1886 and 1887).

Japan—Calendar of the University of Japan (Tokio), for 1888-9.

——— Journal of the College of Science, Imperial University (Tokio); vol. II., parts 4, 5; vol. III., parts 1 and 2.

Lausanne—Bulletin de la Société Vaudoise des Sciences Naturelles; series 3, Nos. 98, 99.

London—Journal of the Royal Microscopical Society, 1888; parts 5, 6, 6a; 1889, parts 1, 2, 3.

——— Proceedings of the Royal Society; vol. XLII., Nos. 256 to 270.

——— List of Fellows, &c., of the Royal Society.

——— The Eruption of Krakatoa and Subsequent Phenomena (Royal Society).

——— Medical Press and Circular; May, 1889.

Massachussetts—Bulletins of the Essex Institute; vol. XIX., Nos. 1 to 12.

Mexico—Anuario del Observatorio Astronomico Nacional de Tacubaya; 1889, vol. IX.

New South Wales—By Committee of Management, Technological Museum of N.S. Wales—The useful Native Plants of Australia (including Tasmania). By J. H. Maiden, F.L.S., &c.

——— Results of Meteorological Observations made in New South Wales in 1886. By *H. C.* Russell, B.A.

——— Rain, River, and Evaporation Observations made in New South Wales during 1887. By H. C. Russell, B.A., &c.

——— Proceedings of the Linnean Society of New South Wales; second series; vol. III., parts 3, 4; vol. IV., parts 1, 2.

——— List of Errata in the Catalogue of the Australia Scyphomedusæ and Hydromedusæ. By R. von Lendenfeld, Ph. Dr., &c.

——— Tabular List of all the Australian Birds known to the Author. By E. P. Ramsay, Curator of the Australian Museum.

——— Minerals of New South Wales. By A. Leversidge, F.R.S.

——— Journal and Proceedings of the Royal Society of New South Wales; vol. XXII., part 2.

——— Australian Museum, Sydney: Memoir. No. 2.

——— Sydney Free Public Library: Report for 1888-9.

——— Calendar of the University of Sydney for 1889.

——— Australian Museum: Report of Trustees for 1888.

——— The Source of the Underground Water in the Western Districts. By H. C. Russell, B.A., F.R.A.S., &c.

——— Results of Rain, River, and Evaporation Observations in New South Wales. By H. C. Russell, B.A., F.R.A.S., &c.

New York, U.S.A.—Transactions of the New York Academy of Sciences; vols. VI., VII., Nos. 1 to 8; vol. IV.

——— Annals of the New York Academy of Sciences, late Lyceum of Natural History; vol. IV., Nos. 3 to 6.

——— The Comparative Danger to Life of the Alternating and Continuous Electrical Currents. By Harold P. Brown.

New Zealand—Report of the Auckland Institute and Museum for 1888-89.

———— Transactions and Proceedings of the New Zealand Institute, 1888; vol. XXI.

———— Reports of Geological Explorations during 1887-8; No. 19; Colonial Museum and Geological Survey of New Zealand.

———— Twenty-third Annual Report on the Colonial Museum and Laboratory.

———— Meteorological Report for 1885.

Norway—Bergens Museums Aarsberetning for 1887.

Ohio, U.S.A.—The Bulletins of the Scientific Laboratories of Denison University; vols. I., II., and IV.

———— Memoirs of the Denison Scientific Association (Granville); vol. I., No. 1.

Paris—Societé Entomologique de France; Bulletins for April and May, 1889.

Philadelphia—Proceedings of the Academy of Natural Sciences of Philadelphia; 1887, part 3; 1888, parts 1, 2, 3.

Queensland—Proceedings of the Royal Society of Queensland; vol. III., parts 4, 5; vol. V., part 5. vol. VI., 1 and 2; and Annual Report, July, 1889.

Rio de Janiero—Revista do Observatorio. Publicacão mensal do Imperial Observatorio do Rio de Janiēro; Anno IV., Nos. 1 to 6.

South Australia—Annual Progress Report of the State Forest Administration in South Australia for the year 1887-8.

———— Report of the Board of Governors of the Public Library, Art Gallery, and Museum for 1887-8.

———— Meteorological Observations taken at the Adelaide Observatory, May, June, July, 1888; Sept., Nov.-Jan.

———— Report on a Journey from Adelaide to Hale River, by H. Y. L. Brown, Govt. Geologist.

———— Report upon the Progress and Condition of the Botanic Garden for 1888.

St. Louis—The Transactions of the Academy of Science of St. Louis; vol. IV., Nos. 1 and 2.

Tasmania—Papers ordered by the Legislature to be printed.

Trenton (U.S.A.)—Journal of the Trenton Natural History Society; No. 3 (1888).

Turin—Bollettino dei Musei di Zoologia ed Anatomia Comparata

della R. Universita di Torino; vol. III., parts 49 to 66.

Victoria—The Victorian Naturalist; vol. V., Nos. 7 to 12; vol. VI., Nos. 1 to 5.

——— Transactions of the Geological Society of Victoria; vol. I., parts 1 and 2.

——— Prodromus of the Palæontology of Victoria. By Frederick McCoy, F.G.S., &c. Decades VI. and VII.

——— Prodromus of the Zoology of Victoria. By Fredk. McCoy, C.M.G., &c. Decade XVII.

——— Victorian Year-Book for 1887-8; vols. 1. to III.

——— Victorian Engineer; vol. III., Nos. 5 to 9.

——— Transactions of the Royal Society of Victoria; vol. I., part 1. Proceedings (new series); vol. I.

——— Iconography of the Australian Species of Acacia and Cognate Genera. Baron F. von Mueller. Decade XIII.

——— Key to the System of Victorian Plants. By F. von Mueller; vols. I. and II.

——— Select Extra-Tropical Plants, &c. Seventh edition. By F. von. Mueller.

——— Systematic Census of Australian Plants. Fourth supplement. Baron F. von Mueller.

——— Results of Astronomical Observations made at the Melbourne University in 1881-2-3-4. By R. L. J. Ellery, F.R.S., F.R.A.S.

——— Catalogue of Oil Paintings, &c., in the National Gallery of Victoria.

Vienna—Verhandlungen der K. K. Geologischen Reichenstalt, 1887, Nos. 1 to 16; 1888, Nos. 12 to 14; 1889, Nos. 1 to 9.

———Kaiserliche Akademie der Wissenschaften in Wien. Sitzung der Mathematisch-Naturwissenschaftliche Classe, 1888, Nos. 16 to 18, and 20 to 24; 1889, Nos. 1 to 3.

———Verhandlungen der K. K. Zoologisch-botanischen Gesellschaft in Wien; vols. 37 and 38.

Washington (U.S.A.)—Publications by the Smithsonian Institute:—

———Annual Report of the Board of Regents of the Smithsonian Institution to July, 1885, part 2.

———Compilation of Notes and Memoranda bearing upon the Use of Human Ordure and Human Urine in Rites

of a Religious or Semi-Religious Character among Various Nations.

Washington (U.S.A.)—Bibliography of the Siouian Language. By J. C. Pilling.

———————Bibliography of the Eskimo Language. By J. C. Pilling.

———————The Use of Gold and other Metals among the Ancient Inhabitants of Chiriqui, Isthmus of Panama. By Wm. H. Holmes.

———————Work of Mound Exploration of the Bureau of Ethnology. By Cyms Thomas.

———————Perforated Stones from California. By Hy. W. Henshaw.

By U.S. Geological Survey:—

———————Mineral Resources of the United States. By David T. Day.

———————Monographs—XII.—Geology and Mining Industry of Leadville, with Atlas.

———————Bulletins, Nos. 40 to 47.

———————Mineral Resources of the United States, year 1887.

LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1889.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows Those marked with an asterisk have contributed papers published in the Society's Transactions.

HONORARY FELLOWS.

			Date of Election
Barkely, Sir Henry, K.C.M.G., K.C.B.	...	...	1857
Ellery, R. L. J., F.R.S. ...	Melbourne	...	1876
Garran, A., L.L.D.	Sydney	...	1853
Hull, H. M.	Hobart	...	1855
Jervois, Sir W. F. D., K.C.M.G., C.B.	New Zealand	...	1878
Little, E.	...	...	1858
Macleay, Sir W., F.L.S.	Sydney	...	1878
*Mueller, Baron F. von, K.C.M.G., F.R.S.	Melbourne	...	1879
Russell, H. C., B.A., F.R.A.S. ...	Sydney	...	1876

CORRESPONDING MEMBERS.

Bailey, F. M., F.L.S.	Brisbane	...	1881
Canham, J.	Stuart's Creek	...	1880
*Cloud, T. C., F.C.S.	Wallaroo	...	1881
*Dennant, J., F.G.S.	Melbourne	...	1888
*East, J. J.	Prospect	...	1884
*Foelsche, Paul	Palmerston	...	1882
Goldstein, J. R. Y.	Melbourne	...	1888
*Hayter, H. H., M.A., C.M.G., F.S,S.	Melbourne	...	1878
Holtze, Maurice	Palmerston	...	1882
*Kempe, Rev. J.	Finke	...	1880
*McGillivray, P. H., M.R.C.S., F.L.S.	Sandhurst	...	1889
*Maskell, W. M., ...	New Zealand	...	1888
Nicolay, Rev. C. G.	Fremantle, W.A.	...	1886
*Richards, Mrs. A.	Beltana	...	1880
*Stirling, James, F.L.S., F.G.S. ...	Melbourne	...	1883

FELLOWS.

*Adamson, D. B.	Adelaide	...	1867
Adcock, D. J.	Adelaide	...	1887
Angas, J. H.	Angaston	...	1874
Angove, W. T., M.R.C.S. ...	Tea Tree Gully	...	1888
Bagot, John	Adelaide	...	1887
*Blackburn, Rev. Thomas, M.A. ...	Woodville	...	1887
Boettger, Otto	Adelaide	...	1884
Bragg, Prof., M.A.	Adelaide	...	1886
Brown, J. E., F.L.S.	Adelaide	...	1881
Brown, L. G.	Two Wells	...	1882
*Brown, H. Y. L., F.G.S.	Adelaide	...	1883
Bussell, J. W.	Adelaide	...	1884

Campbell, Honorable Allan, M.L.C., L.R.C.P., Edin.	Adelaide	1882
Chapman, R. W., B.Sc	Adelaide	1888
*Cleland, W. L., M.B., Ch.M., F.R.M.S.	Parkside	1879
(L) Cooke, E.	Adelaide	1876
Cox, W. C.	Semaphore	1880
*Crawford, F. S.	Adelaide	1865
Davis, F. W.	Adelaide	1882
*Dixon, Samuel	Adelaide	1887
Dobbie, A. W.	Adelaide	1876
Elder, Sir Thomas	Adelaide	1871
Eyres, Thomas...	Adelaide	1887
Fleming David...	North Adelaide ...	1886
Fletcher, Rev. W. R., M.A. ...	Kent Town	1876
Foote, H.	Outalpa	1883
Fowler, W.	Kulpara	1882
Fraser, J. C.	Adelaide	1889
Gardner, Wm, M.D., C.M. ...	Adelaide	1882
Gill, H. P.	Adelaide	1883
Gill, Thomas, ...	Adelaide	1885
*Goyder, Geo., jun.	Adelaide	1880
Grasby, W. C	Adelaide	1887
Grundy, E. B.	Adelaide	1882
Harris, C. H.	Adelaide	1883
Harrold, A. L.	Adelaide	1876
Hay, Hon. A, M L.C.	Adelaide	1861
Henry, A., M.D.	Adelaide	1882
*Howchin, W., F.G S.	Goodwood East ...	1883
Hughes, H. W.	Booyoolie	1883
(F) Kay, R.	Adelaide	1853
Knevett, S.	Adelaide	1878
*Lamb, Prof., M.A., F.R.S. ...	England	1883
Laughton, E.	Adelaide	1874
Lendon, A. A., M.D.	Adelaide	1884
Lloyd, J. S.	Adelaide	1856
Lower, O. B.	Parkside	1888
*Lucas, R. B.	Adelaide	1885
Magarey, A. T.	North Adelaide ...	1873
*Magarey, Hon. S. J., M.B. ...	Adelaide	1874
Mayo, Geo., F.R.C S.	Adelaide	1853
Mayo, G. G.	Adelaide	1874
Mestayer, R. L., F.R.M.S. ...	Sydney	1883
*Meyrick, E. T., B.A.	England	1881
Middleton, W. J. E.	Upper Sturt	1882
Mitchell, J. T., M.D.	Port Adelaide... ...	1885
Molineux, A.	Kent Town	1880
(L) Murray, Hon. David, M.L.C. ...	Adelaide	1859
Munton, H. S....	Adelaide	1884
*Parker, Thos.	... ...	1883
Phillips, W. H.	Adelaide	1883
Phillipson, W. T.	Adelaide	1887
Poole, W. B.	Adelaide	1886
Robertson, R., F.F.P.S.	Adelaide	1882
*Rennie, Prof. E. H., D.Sc., F.C.S. ...	Adelaide	1885
Renner, F. E., M.D.	Carrieton	1885
Robins, A. F.	Adelaide	1887
Russell, William	Port Adelaide... ...	1879

*Rutt, Walter, C.E.	Adelaide	1866
Salom, Hon. M., M.L.C.	Adelaide	1866
*Schomburgk, R., Ph.D.	Adelaide	1865
Scott, Jas. L.	Hyde Park	1865
Smeaton, Thos. D.	Mount Barker... ...	1857
Smith, R Barr	Adelaide	1871
Smythe, J. T., B.A., B.E.... ...	Glenelg	1882
*Stirling, E. C., M.D., F.R.C.S. ...	Adelaide	1884
Stuckey, J. J, M.A.	Adelaide	1878
*Tate, Prof R., F.G.S, F.L.S. ...	Adelaide	1876
Thomas, J. D., M.D, F.R.C.S. ...	Adelaide	1877
*Tepper, J. G. O., F.L.S.	Norwoood	1878
*Todd, Charles, C.M.G., M.A., F.R.S.	Adelaide	1856
Tyas, J. W.	Adelaide	1882
Umbehaun, C....	Adelaide	1879
Vardon, Joseph	Adelaide	1889
Varley, A. K.	Mount Gambier ...	1883
*Verco, J. C., M.D., F.R.C.S. ...	Adelaide	1878
Vickery, G.	Meadows	1868
Wainwright, Ed. H., B.Sc. ...	St. Peters	1883
Ware, W. L.	Adelaide	1878
Way, E. W., M.B.	Adelaide	1879
Way, S. J., Chief Justice	Adelaide	1859
Wheeler, F.	Freemantle, W. A. ...	1884
*Whittell, H., M.D., F.R.M.S. ...	Adelaide	1882
Wilson, John, F.E.T.S.	Goodwood	1887
*Wragge, C. L., F.R.G S.	Brisbane	1887
*Zietz, A.	Adelaide	1886

ASSOCIATES.

Hodgson, Mrs....	Port Victor	1884

APPENDIX.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

SIXTH ANNUAL REPORT OF THE COMMITTEE, BEING FOR THE YEAR ENDING SEPTEMBER 30TH, 1889.

The Committee have pleasure in presenting the following abstract of the work of the Section for the past year :—

Excursions.—During the year eleven excursions have been held, at most of which the attendance has been very satisfactory. Some fresh localities have been visited, but no excursion occupying more than one day has been made, as was the case in the previous year. As a change from visits to the hills, which are mostly devoted to the study of botany, there have been a trawling trip, an excursion to the beach at Marino for the collection of shells, &c., and a visit to the Dry Creek Smelting Works.

Evening Meetings.—There have been seven evening meetings during the year. The attendance at these has varied considerably, but on the whole shows an improvement on that of last year. The papers have embraced a wide range of subjects, and have been contributed by the following gentlemen, viz., Professor Tate, F.G.S., Messrs. J. G. O. Tepper, F.L.S., W. B. Poole, D. D. Rosewarne, J. J. East, M. S. Clark, and W. Howchin, F.G.S. The exhibits at these meetings form an important feature, and it is pleasing to notice that they are increasing in number and in interest.

Show of Native Plants, &c.—This was held in the Town Hall in October of last year, and for a first attempt was a considerable

success. It may be stated that this was not intended (as some may have thought) to be chiefly a show of living wild flowers, there being obvious objections to such an exhibition. The principal feature of the show was the Herbaria, while a fine collection of Algæ and of floral paintings added to its variety and attractiveness. In conjunction with this exhibition the Boys' Field Club had a very creditable display of a similar character.

Protection of our Native Fauna and Flora.—The Standing Committee appointed for this purpose have devoted much time and attention to the subject. From a special report of the Committee which will be presented particulars will be gathered as to the progress made in this direction.

Local Correspondents.—Steps have been taken with a view to secure the assistance of correspondents in various parts of the colony, who, it is thought, will in many ways be of service to the Section. It is hoped that these persons will take an interest in the Natural History of the neighbourhood in which they reside, and that their aid will be secured in the preservation of native plants and animals, as well as in furnishing information as to poisonous plants, introduced weeds, native fodder plants, &c.

"*Proceedings.*"—Arrangements have been made whereby the "Proceedings" of the Section for the current year will be printed more fully than before, besides being issued at a moderate cost and at a much earlier date than usual.

Membership.—Eighteen new members have been added to the roll during the year, and twenty names have been removed. Of the latter, seven have left the colony and seven have resigned, the balance being struck off for various reasons. The number now on the roll is 112.

WALTER HOWCHIN, Chairman.
W. H. SELWAY, JUN., Hon. Sec.

Adelaide, 17th September, 1889.

ANNUAL PROGRESS REPORT

Presented by the Native Fauna and Flora Protection Committee at the meeting of the Field Naturalists' Section of the Royal Society held on September 17, 1889.

The Committee appointed at the last annual meeting of the Section to endeavour to secure better protection for the native fauna and flora, desire to present the following progress report:—

National Parks.—As the result of a deputation which waited

on the Premier of the day in October, 1888, together with considerable subsequent correspondence and other action, a promise has been obtained from the Government to the effect that reserves of this character will be made, although the size and other details have not yet been settled.

The Game Laws.—Through the aid of Mr. R. G. Solomon, of Newark, United States, and of local skin merchants, the Government was induced to introduce an amending Game Bill, providing for the partial protection of kangaroos and opossums. The measure, however, met with strong opposition in the Legislative Council, and was rejected by that House on the second reading, without a division being taken. The arguments used by the adverse speakers were apparently based upon the state of affairs existing three years ago and not upon the facts as they now are. The only hope of the absolute extinction of the kangaroo being prevented seems to lie in the fact that before long its numbers will have become so small as to render its chase for the purposes of commerce unremunerative. The Bill was by no means of the comprehensive character desired by the Section, but no further legislation in this direction can be attempted till next session. In accordance with the request of the Committee, placards notifying the chief provisions of the Game Act have been circulated throughout the districts affected by its enactments by order of the Commissioner of Crown Lands, who has given instructions to the police to secure, as far as possible, the observance of the statute. The corresponding members of the Section have also promised to help in this work.

Education in Natural History.—The Committee requested the Education Depertment to give more direct instruction in natural science, especially in its relations to the native fauna and flora, and although not much has yet been done towards this end, there is reason to believe that the next few years will see a considerable advance in the direction indicated. The extension of the operations of the Boys' Field Club to the country towns of the colony will also largely tend to promote that healthier public sentiment which is so desirable in the interests of the movement.

Forest Reserves.—Determined efforts have been made during the year by a certain section of the community to obtain the extensive resumption of forest and other reserves for the purposes of cultivation. The Committee had a motion tabled at a meeting of the Section protesting against any such action being taken, and the resolution was forwarded to the Commissioner of Crown Lands. It is with much pleasure that the Committee have noticed that a motion was subsequently passed in the Upper House affirming the undesirableness of resuming the forest reserves.

Information as to the best methods of securing the objects of the Committee is now being sought by the Committee from similar organizations in various parts of the world, and every feasible means will be used to attain the desired end. The movement has received the approval of the Royal Society and the support of the Geographical Society, the Microscopical Section, and of many other organizations. The subject will be discussed at the next meetings of the Australasian Association for the Advancement of Science, and vigorous efforts have been made by the Committee to excite a healthy interest in the matter in the different colonies.

In conclusion the Committee, although regretting that they can show but few distinctly tangible results, yet hope that the movement will eventually prove in a considerable measure successful, and they trust that they will have the cordial assistance of all with any love for the plants and animals of their country.

SAMUEL DIXON, Chairman.
A. F. ROBIN, Hon. Sec.

September 17, 1889.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

RECEIPTS AND EXPENDITURE FOR THE YEAR ENDING 30TH SEPTEMBER, 1889.

DR. RECEIPTS.	£	s.	d.
To Balance brought forward	2	12	6
" Grant from Royal Society	25	0	0
" Amount received from Subscriptions	23	0	0
	£50	12	6

EXPENDITURE. CR.	£	s.	d.
By Printing	9	5	6
" Postages	7	18	0
" Advertising	3	0	8
" Attendance (caretaker)	1	5	0
" Bugle	1	15	0
" Sundries	1	3	2
	£24	7	4
" Subscriptions handed over to Hon. Sec. Royal Society	23	0	0
	£47	7	4
" Balance in hand	3	5	2
	£50	12	6

Audited and found correct,
J. H. C. LANGDON, THOS. EVANS, } Auditors.
Adelaide, 16th September, 1889.

W. H. SELWAY, Jun., Hon. Sec.

MICROSCOPICAL SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT FOR 1888-9.

We are glad to be able to report that during the year increasing interest has been manifested in the work of the Section. The attendance at the meetings has been much better than in the past, and the members who were present appear to have profited by the various subjects brought under discussion. The plan adopted this session of devoting a short time of each evening to practical demonstration on some elementary branch of microscopical manipulation seems to have had a beneficial effect, and it is to be hoped that, if possible, this plan will be continued.

The excursions made in search of objects have been a source of great pleasure, and many places near Adelaide have been found which afford a valuable field for microscopical research, being rich in organisms—some no doubt new to science.

The Section has been fortunate during the year in receiving two large donations of books. Mr. C. C. Farr, on leaving for England, presented us with a large number of microscopical magazines; and Mr. H. C. Mais has again shown his interest in us by making us a further donation of all his large collection of bound works on the microscope, in all twenty-nine volumes. We have now, for a young Society, a very complete and valuable reference library.

The present number of members is thirty-three. Several have resigned during the year, and six new members have been elected. The average attendance at the meetings has been eleven, exclusive of visitors.

The subjects discussed at the meetings were as follows:—

1888.

Oct. 9. Pollen in its relation to hay fever, by F. S. Crawford.
Nov. 13. Forms of Life found by Dredging, by Mr. Baker.

1889.

Mar. 12 Cleaning lenses, slips, and cover-glasses, by Mr. F. S. Crawford. Structure of the Floscularia, by Mr. Poole.

Apr. 9. Demonstration on cell-making, by Mr. Poole. Paper on a Hydroid Zoophyte, Cordylophora lacustris, by Mr. Baker.

May 14. Paper on Illumination by Condensers, by Dr. Whittell

June 11. Demonstration on mounting wool and fur, by Mr. Poole. Illumination by the Abbe-Condenser, by Dr. Whittell.

July 9. Paper on Pond life, by Mr. J. W. Bussell.

Aug. 13. South Australian Polyzoa, by Mr. Zietz.

Sept. 3. Demonstration on use of Camera-lucida, by Mr. F. S. Crawford.

Excursions have been made to the following places:—

April 6. Hope Valley Reservoir.

May 1. Botanic Gardens.

July 6. Blackwood.

Aug. 10. North Arm.

Signed, F. S. CRAWFORD, Chairman.
J. W. BUSSELL, Hon. Secretary.

MICROSCOPICAL SECTION OF ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Expenditure for the Year ending 30th September, 1889.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
To Balance in hand 30th September, 1888 ..	6	14	0	By Binding Magazines	0	7	6
" Members' Subscriptions	7	5	0	" Printing and Stationery	0	13	6
" Grant from Royal Society	7	5	0	" Magazines	1	18	3
				" Rail-carriage on Books	0	12	0
				" Postages, &c.	0	17	4
				" Attendant	1	7	0
				" Subscriptions paid Royal Society	7	5	0
				Cash in hand	8	3	5
	£21	4	0		£21	4	0

Examined and found correct.

EDGAR J. BRADLEY, Auditor.

J. W. BUSSELL, Hon. Secretary.

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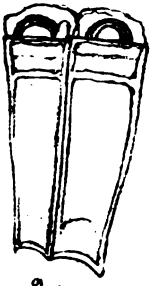
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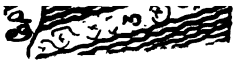

Plate III.

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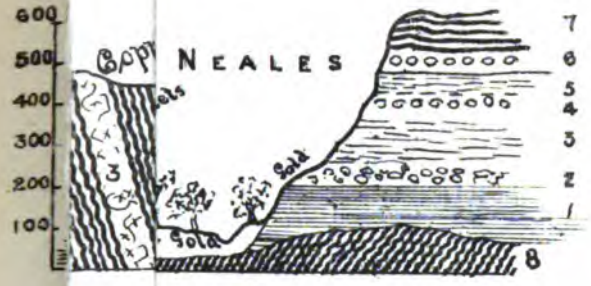
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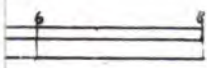
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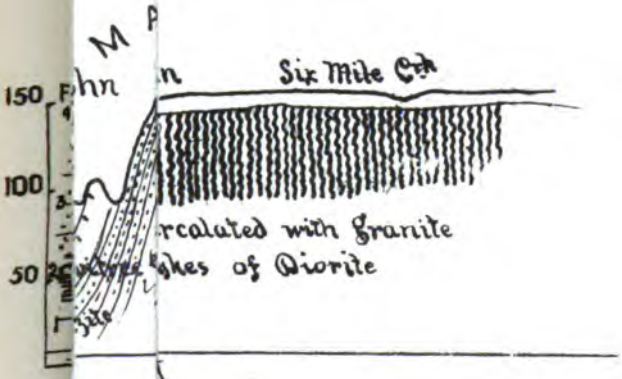
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TRANSACTIONS

OF THE

Royal Society of South Australia.

VOL. XIII.—Part I.

EDITED BY PROFESSOR RALPH TATE.

ISSUED JUNE, 1890.

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Adelaide:

W. C. RIGBY, 74, KING WILLIAM STREET.

1890.

Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 85, Milk Street, Cheapside, London."

UNIVERSITY OF MICHIGAN LIBRARIES

An Additional List of South Australian Polyzoa.

By P. H. MacGillivray, M.A., M.R.C.S., F.L.S., Corr. Memb.

[Read November 5, 1889.]

Plate I.

Mr. Thomas D. Smeaton has recently sent to me for examination a large number of specimens of South Australian Polyzoa. The total number of species in the collection is 119, and of these 71 do not occur in the list recently contributed to the Society. They are mostly well-known Victorian forms, but several are of rare occurrence, and three have not previously been described.

The following is a list, with localities, of those not previously noticed:—

CLASS POLYZOA.

Order Gymnolæmata, *Allman.*

(infundibulata, *Gervais*).

Suborder Cheilostomata.

FAMILY AETEIDÆ.

Aetea, *Lamx.*

A. dilatata, Busk. Robe.

FAMILY EUCRATEIDÆ.

Dimetopia, *Busk.*

D. spicata, Busk. Robe.

FAMILY CHLIDONIIDÆ.

Chlidonia, *Savigny.*

C. Cordieri, Aud., sp. Kangaroo Island.

FAMILY CATENICELLIDÆ.

Catenicella, *Blainville.*

C. alata, Wyv. Thomson.
C. plagiostoma, Busk. Port Elliott.
C. formosa, Busk. Port Elliott.
C. gracilenta, McG. Robe.
C. carinata, Busk. Kangaroo Island.
C. delicatula, J. B. Wilson, sp.

CLAVIPORELLA, *McG.*

C. geminata, Wyv. Thomson, sp. Glenelg.
C. aurita, Busk, sp. Robe.

FAMILY CELLULARIIDÆ.

DIDYMIA, *Busk.*

D. simplex, Busk.

SCRUPOCELLARIA, *Van Beneden.*

S. cyclostoma, Busk.
S. ornithorhynchus, Wyv. Thomson. An imperfect fragment.

CANDA, *Lamx.*

C. arachnoides, Lamx. Brighton.

CABEREA, *Lamx.*

C. Darwinii, Busk. Encounter Bay ; Robe.
C. rudis, Busk. Robe.
C. grandis, Hincks. The specimens are mostly very rigidly calcified.

MENIPEA, *Lamx.*

M. cyathus, Wyv. Thomson. Robe.
M. tricellata, Busk, sp. Robe.

FAMILY SALICORNARIIDÆ.

CELLARIA, *Lamx.*

C. hirsuta, McG. Encounter Bay.

FAMILY BICELLARIIDÆ,

BICELLARIA, *Blainville.*

B. tuba, Busk. Encounter Bay,
B. gracilis, Busk. Robe.

FAMILY FLUSTRIDÆ.

CARBASEA, *Gray.*

C. dissimilis, Busk.

FAMILY MEMBRANIPORIDÆ.

PYRIPORA, *D'Orbigny.*

P. polita, Hincks, sp. Kangaroo Island.

ELECTRA, *Lamx.*

E. multispinata, Hincks, sp.
(Membranipora pilosa, *var.* multispinata, *Hincks.*)

BATHYPORA, *McG.*

B. (Membranipora) nitens, Hincks.

MEMBRANIPORA, *Blainville.*

M. membranacea, Linn. sp. Brighton, Robe.

M. prælonga, n. sp. Fig. 1. Zoarium encrusting. Zoœcia opposite in regular longitudinal and transverse series, very large, much longer than broad, separated by narrow raised lines; upper extremity arched and thickened; no spines or processes.

This is an exceedingly delicate species, spreading as a thin film over the surface of a broad leaf of, seemingly, Zostera. The zoœcia are very regular in transverse and longitudinal rows, the separating walls being very slender. There are no spines or processes as in its nearest congener *M. membranacea.* A curious circumstance is that many of the longitudinal rows consist entirely of aborted zoœcia, which are of the same length as the others, but are narrower, destitute of mouth, and have the transverse separating partitions straight and very thin. In many of these there is a white shining fibrous bundle, the nature of which is not apparent; it may be parasitic.

Mr. Smeaton informs me that this was found at Wallaroo by Mr. O'Halloran.

M. corbula, Hincks. Robe.

AMPHIBLESTRUM, *Gray.*

A. argenteum, McG. (Lepralia trifolium, *McG.*)

A. cervicorne, Busk.

BIFLUSTRA, *D'Orbigny.*

B. jugalis, n. sp. Figs. 2 and 2*a*. Zoarium crustaceous. Zoœcia alternate, in regular lines, elongated, quadrate; margins thick, granular; upper margin thick, with a short blunt process at each end; anterior surface for a large extent strengthened by a very thin, slightly granular, calcareous layer.

Of this there is only a single small specimen. The anterior thickening of the surface is very indistinct, and I am not satisfied that it should not rather be referred to *Membranipora.*

FAMILY MICROPORIDÆ.

THAIROPORA, *McG.*

T. dispar, McG. Brighton.

DIPLOPORELLA, *McG.*

D. cincta, Hutton, sp. Brighton.

MICROPORA, *Hincks.*

M. coriacea, Esper., sp. Glenelg.

M. perforata, McG. Robe.

FAMILY STEGANOPORELLIDÆ.

STEGANOPORELLA, *Smitt.*

S. magnilabris, Busk, sp. Aldinga.

FAMILY CRIBRILINIDÆ.

HIANTOPORA, *McG.*

H. ferox, McG.

FAMILY MICROPORELLIDÆ.

MICROPORELLA, *Gray.*

M. ciliata, Linn., sp.
M. Malusii, Audouin, sp.
M. diadema, McG. Robe.
" var. *longispina*, McG. Semaphore.

ADEONA, *Lamx.*

A. albida, Kirchenpauer, var. *avicularis*, McG.

FAMILY ESCHARIDÆ.

SCHIZOPORELLA, *Hincks.*

S. Maplestonei, McG. Figs. 4, 5, and 5*a*. Of this two marked forms occur, which might almost be considered as distinct species. In the typical form the zoœcia are rhomboidal, separated by narrow raised margins, the surface shining and perforated. The mouth is arched above, wider than high. The lower lip straight, with a small rounded sinus. The peristome above is slightly thickened. On each side in front, below the mouth, is a small, solid, rounded protuberance, occasionally wanting. The oœcium is broad, prominent and flattened in front, the upper margin forming a thickened and smooth band, a more or less regular row of white-bordered pores along the inner margin of the band, and others scattered over the anterior surface. The peristome of the oœcial cells is produced as a flat pointed process from each side to meet in the centre, forming an arch over the suboral sinus. The front of the oœcium in perfect specimens is usually of a bright-brown colour, forming a marked contrast to the white rim. In others, however, the bright colour is lost.

I have no doubt this is identical with *S. lucida*, Hincks (Ann. and Mag. Nat. Hist., March, 1885).

The other form, which may be named var. *avicularis*, has an elliptical avicularium placed obliquely below or to one side of the oral sinus; below or supporting the avicularium there is usually a small, irregular, glassy, calcareous mass, extending partly down the centre of the cell, and frequently with one or more shining nodules comparable to the two suboral processes in the normal form. The peristome in the barren cells is usually produced on

one side. The œcia are more prominent superiorly, the peristomial arch thicker and stronger, and the surface occasionally traversed by distinct lines. Some œcia are coloured a bluish purple, with the margin and peristome a dead-white.

S. dædala, McG. Robe.

S. hyalina, Linn. sp., var. *tuberculata*. Robe.

S, Ridleyi, McG.

S. Smeatoni, n. sp. Figs. 3 and 3*a*. Zoarium bilaminate. Zoœcia in longitudinal lines, separated by furrows, at the bottom of which is a narrow raised line, elongated, raised in the centre, with numerous small perforations; mouth arched above, lower lip with a wide sinus and a minute denticle on each side. Operculum with a narrow membranous fringe. Œcia large, granular, traversed by depressed lines, orifice wide, the lower lip with a broad shallow sinus.

The zoœcia at the edge of the zoarium are much elongated, farther back becoming shorter. They are arranged more or less in lines, separated by furrows. The surface is covered with small perforations, frequently arranged in a line towards each margin and one down the centre. They are raised in the middle, and below the mouth there is usually a smooth nodule or umbo. The sinus in the lower lip is wide, tolerably deep, with the angle rounded. On the œcia there is generally a short, depressed line extending vertically upwards and bifurcating so as to divide the surface into three elevated portions. On the older parts of the zoarium the separating furrows are nearly obliterated.

HIPPOTHOA, *Lamx.*

H. divaricata, Busk.

PETRALIA, *McG.*

P. undata, McG.

PORELLA, *Gray.*

P. papillifera, McG.

P. marsupium, McG.

PORINA, *D'Orbigny.*

P. larvalis, McG. Semaphore.

MUCRONELLA, *Hincks.*

M. vultur, Hincks.

M. tricuspis, Hincks.

M. diaphana, McG. Brighton.

M. excavata, McG. This species is identical with *M. præstans*, described by Hincks from New Zealand. The specimen figured in the Zoology of Victoria had no avicularia, which, in fact, are frequently absent.

RHYNCHOPORA, *Hincks.*

R. bispinosa, Johnston, sp. Semaphore.

FAMILY CELLEPORIDÆ.

CELLEPORA, *Fabricius.*

C. bispinata, Busk.
C. tridenticulata, Busk.
C. prolifera, McG.

SCHISMOPORA, *McG.*

S. signata, Busk, sp.
S. munita, McG., sp.

FAMILY RETEPORIDÆ.

RETEPORA, *Imperato.*

R. porcellana, McG.
R. monilifera, McG.
form, *munita*, McG.
form, *umbonata*, McG.
R. granulata, McG.

SUBORDER CYCLOSTOMATA.

FAMILY IDMONEIDÆ.

HORNERA, *Lamx.*

H. foliacea, McG.

FAMILY TUBULIPORIDÆ.

ENTALOPHORA, *Lamx.*

E. australis, Busk, sp. Encounter Bay.

FAMILY DISCOPORELLIDÆ.

LICHENOPORA, *Defrance.*

L. echinata, McG.
L. reticulata, McG. Brighton.

SUBORDER CTENOSTOMATA.

FAMILY VESICULARIIDÆ.

AMATHIA, *Lamx.*

A. bicornis, Tenison-Woods. Robe.

The following are additional localities for species mentioned in previous paper :—

Catenicella ventricosa, Busk. Robe.
C. crystallina, Wyo. Thoms. Port Elliott.

Calpidium ponderosum, Goldst., sp. Aldinga.
Cellularia cuspidata, Busk. Encounter Bay.
Scrupocellaria scrupea, Busk. Encounter Bay.
Menipea crystallina, Busk, sp. Robe.
Bugula cucullata, Busk. Lacepede Bay.
B. dentata, Lamx. Robe.
B. neritina, Linn., sp. Brighton.
Carbasea pisciformis, Busk. Kangaroo Island.
Flustra denticulata, Busk. Encounter Bay.
Electra flagellum, McG. Brighton.
Thairopora Woodsii, McG. Semaphore.
T. Jervoisii, Hincks, sp. Brighton.
Cribrilina monoceros, Busk. Brighton.
Schizoporella schizostoma, McG. Brighton.
Mucronella Ellerii, McG. Glenelg.
Smittia trispinosa, Johnston, sp. Brighton; Semaphore.

EXPLANATION OF PLATE I.

Fig. 1. *Membranipora prælonga*, × 20.

Fig. 2. *Biflustra jugalis*, group of zoœcia × 45. Fig. 2*a*. Single zoœcium, showing the oral flap, × 45.

Fig. 3. *Schizoporella Smeatoni*, × 45, showing zoœcia and oœcium. Fig. 3*a*. Operculum, × 100.

Fig. 4. *Schizoporella Maplestoni*, normal form, × 45.

Fig. 5. *Id*, var. *avicularis*, showing suboral avicularium and thickening of peristome in ordinary zoœcia. Fig. 5*a*. Another zoœcium and oœcium from the same specimen. All × 45.

A List of the Whales and Dolphins of the South Australian Coast in the Public Museum, Adelaide.

By A. Zietz, Assistant Museum-Director.

[Read December 3rd, 1889.]

FAMILY BALÆNIDÆ (Whalebone Whales).

1. Neobalæna marginata, *Gray*. Pigmy Whale.

Of this species three individuals in the flesh have been received at the Museum, two from Kangaroo Island, and one very young animal from Encounter Bay; besides which there is an ear-bone from the former locality. The species was first found on the New Zealand coast, and was described in 1870 from some plates of baleen in the British Museum and from the skull and baleen of a small individual, 16 feet long, that was cast ashore on the Island of Kawau;* it was considered by Dr. Gray to represent in the Southern Seas the Great Right Whale of the Arctic Ocean. At a later period, it was found on the coast of Western Australia; and quite recently in our own waters.

The external characters of this whale were unknown till the receipt of the specimens at the Adelaide Museum; two of which have been photographed and exact measurements taken from the fresh animals; thus adding valuable information to our knowledge of this species.

The species-name is in reference to the outer blackish margin on the baleen.

2. Megaptera boops, *Linn.* Rorqual.

To this species probably belongs the whale which was stranded at Corny Point, the skeleton of which is displayed in the Whale-Shed, annexed to the Museum, as Mr. G. Beazley, our taxidermist, informs me that the underside of this specimen was very strongly folded in a longitudinal direction, commencing from the anterior point of the lower jaw.

According to Professor W. H. Flower it is uncertain whether all the following specimens, referred to in his Catalogue (British Mus., 1885), belong to one or several species. If to more than one their distinctive characters have not been defined. The British Museum possesses examples from Greenland, California, and New Zealand.

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* Hector, New Zealand Cetaceans; Phil. Soc., Wellington, 1872.

FAMILY PHYSETERIDÆ (Cachalots).

3. PHYSETER MACROCEPHALUS, *Linn.* Cachalot or Sperm Whale.

The Museum possesses a skeleton, measuring 53 feet in length, obtained from an individual which was stranded at Point Bolingbroke, Port Lincoln, November, 1881. This species is widely distributed.

4. KOGIA BREVICEPS, *Blainville.* Short-headed Cachalot.

A lower jaw of this very small species was recently obtained by Mr. Adcock at Middleton, Encounter Bay, and by him presented to the Museum. The dental formula is $\frac{0}{1}\frac{0}{1}$; the teeth being only in the lower jaw, as in the other cachalots; the last tooth on each side has its point directed backwards, and in its whole length nearly rests on the ridge of the jaw—a peculiarity which I find not mentioned in any description of the species. The lower jaw is slight and fragile, and has scarcely any condyles; the broad ramus is nearly as thin as paper, with the sides much inflexed.

This species is recorded from New South Wales and Madras; and now for the first time from South Australia.

FAMILY DELPHINIDÆ (Dolphins).

5. GRAMPUS GRISEUS. Grampus.

A skeleton of a grampus, eleven feet long, was found on the beach between Glenelg and Brighton, the skull of which is in the Museum. It probably belongs to the above-named species, the only one in the genus which is recorded from the North Sea to Cape Town.

6. DELPHINUS DELPHIS, *Linn.* The Common Dolphin.

This species is figured by Dr. Gray, "Zoology of the Voyage of the Erebus and Terror," under the name of *D. Forsteri;* but Professor Flower, in the Brit. Mus. Cat., refers it to the Linnean species, which, according to him, has a very wide range, embracing the shores of the North Atlantic, South Africa, Tasmania, New Zealand, South Seas, and Antarctic Seas. It is common on our coast.

7. STENO ROSTRATUS.

This species, as in the case of the Common Dolphin, is incorrectly called a *porpoise.* It is easily distinguished from the porpoise by having a much larger and thicker head, and the snout more tapering, and not so abruptly narrowed; the tail and breast-fins are also much broader, and the body narrowed behind. It is not so neatly shaped as *Delphinus delphis*, and the teeth are much stronger and less numerous.

The Brit. Mus. Cat. records it from Cape Seas, Admiralty Islands, and India. Its presence in the Australian Seas has hitherto not been noted, though it is not uncommon on our coast.

On some Australian Species of the Family Archæocyathinæ.

By R. Etheridge, Jun., Palæontologist to the Australian Museum and Geological Survey of N. S. Wales

Plates II. and III.

[Read December 3rd, 1889.]

Some months ago I received from Prof. Ralph Tate, F.L.S., &c., of Adelaide University, the fossils which form the subject of the present notice. After some trouble they were provisionally determined as *Archæocyathus*, a low form of invertebrate life characteristic of the Cambrian strata of North America, and laid aside pending the appearance of a memoir on this and allied genera by my friend George Jennings Hinde, Ph.D., which I casually heard was in preparation. This having now appeared,* the subject may be well resumed.

Dr. Hinde's excellent paper renders it quite unnecessary for me to retraverse old ground, but simply recommending it to those interested in these remarkable genera as an admirable solution of a difficult and obscure subject, I may at once proceed to compare the Australian fossils with the various genera comprising the Family *Archæocyathinæ*.

First, however, it is requisite to fix the localities of the Australian fossils. They are from Ardrossan, Yorke's Peninsula; the Wirrialpa and Blinman Mines, near the Blinman, a mining township on Eurilkina Creek, Flinders Range; and Kanyka, north-east of Port Augusta.

The only geological information I am in possession of relates to the first of these localities. The Ardrossan rocks appear to have been first described by Mr. Otto Tepper, and we are also indebted to him for the first discovery of its fossils. In his paper, "Introduction to the Cliffs and Rocks at Ardrossan"† he describes the Palæozoic rocks as consisting of the Ardrossan sandstone overlain unconformably by Tertiary rocks, and conformably below it a variegated and dark-coloured limestone and white and yellow marbles, called the Parara limestone. He remarks—"Both varieties of the upper marbles contain distinct

* On *Archæocyathus*, Billings, and on other Genera allied to or associated with it from the Cambrian Strata of North America, &c.—Quart. Journ. Geol. Soc., 1889, XIV., p. 125.

† Trans. and Proc. Phil. Soc., Adelaide, for 1878-79 (1879), p. 70.

fossils and abundantly minute fragments of such, but the upper one by far the most, conspicuous amongst which occasionally a trilobite; and coral structure appears to perfection in sea-rolled pebbles, the fossil shows in beautiful contrast of colour upon the smooth surface. Prof. Tate holds the tentative opinion that the fossils are of the Lower Silurian age of Murchison." At p. 48 of the same volume Prof. Tate states that "the fossils consist chiefly of heads and other fragments of a species of blind trilobite, probably an *Olenus*, a small species of *Euculiomphalus*, a *Capulus*, a *Creseis?*, and fragments of corals (some of which show a cystiphylloid structure)." Below these beds Mr. Tepper describes unconformable to them the "Ardrossan Marbles," a yellowish or pink-coloured, but not variegated, saccharoid limestone of Pre-Silurian age. The age and relation of these fossiliferous limestones to foreign equivalents will be discussed later.

The Family Archæocyathinæ of Bornemann consists of the Genera *Archæocyathus*, Billings, *Ethmophyllum*, Meek, *Coscinocyathus*, Bornemann, *Anthomorpha*, Bornemann, *Protopharetra*, Bornemann, and *Spirocyathus*, Hinde, according to the last-named author.

If certain determinations of the late Prof. L. G. de Koninck are to be relied on the family is already known in the Devonian (?) rocks of New South Wales. In 1876 he describes some ill-preserved fossils from the Yass district, provisionally called *Archæocyathus (?) Clarkei*.* They formed a portion of the late Rev. W. B. Clarke's collection in the Mining and Geological Museum, and were destroyed with the general body of that series in the Garden Palace fire, and I regret to say we are not again in possession of a specimen of this fossil. Its true affinities must for the present, therefore, remain doubtful, for we find Dr. Hinde remarking—"Judging from the description and figures, no definite opinion can be formed as to their real character." According to DeKoninck *A. (?) Clarkei* consists of irregularly-plicated bodies of considerable extent, both laterally and longitudinally, enclosing deep cavities of very variable form. The tissue forming the walls is from eight to ten millimetres in thickness, the external walls being furnished with irregular protuberances, and pierced by small openings. The tissue between the walls is irregularly spongy, and retiform in structure.

So far as I am aware this is the only reference to the occurrence of a supposed *Archæocyathus*, or one of its allies, in Australia, but quite recently Prof. W. J. Stephens, M.A., has obligingly lent me two specimens from the neighbourhood of Yass, which may turn out to be of this nature. I may, however, state

* Foss. Pal. Nouv. Galles du Sud, 1876, pt. 2, p. 68, t. 2, f. 1.

that about five years ago, when examining the matrix of the Trilobites from Ardrossan, with Dr. Henry Woodward, we noticed fragments of an obscure fossil, believed to be those of a coral, and evidently those referred to by Mr. Tepper, which greatly puzzled us. They were described by Dr. Woodward in the following words.* The calices "are about twelve millimetres in diameter. The septa are numerous, and very short, with a thickened spongy columella; the corallites are irregular, and few in number, and appear to be united by a cellular cœnenchyma." The fragments referred to in this quotation I now know to be the same as those at present under description.

The genus *Archæocyathus*, briefly stated, consists of free cup-shaped or turbinate forms, with a tubular central cavity. "The wall of the organism consists of an outer and inner lamina or plate, bounding the exterior and the inner surface of the cup respectively, and a series of stout vertical radial septa, which, like those of a coral, extend from the outer to the inner wall plates. Both walls are perforate, but a delicate imperforate enveloping lamina exists. The septa are also perforate, even in thickness, and in their distance apart, the interseptal loculi being filled with dissepiments. The outer surface of the cup is either smooth, horizontally ridged, or rugose. New septa are introduced by intercalation.

This is the general structure of *Archæocyathus*, without entering into minute details, as emended by Dr. Hinde. The genus *Ethmophyllum* is substantially the same, except that the inter septal locali are not filled with dissepiments, and the inner wall "instead of communicating with the interior of the cup or tube by simple perforations consists of a series of relatively large canals directed obliquely upward and inward, so that in transverse section they present the appearance of one or more rows of vesicles cut across."

Archæocyathus is now known to occur in North America and the island of Sardinia, and is characteristic of Lower Cambrian strata; whilst *Ethmophyllum* has been met with in strata of the same age in the country first named and Spain.

The fossils from South Australia are either enclosed in limestone or are on the weathered surfaces of the latter, with one or two exceptions. They all present, more or less, the same appearance, excepting only the colour of the limestone, which varies from dark bluish-grey to a light grey, or even a rock with a warm reddish tint, as that from Ardrossan. The examples from Kanyka are weathered partially out of the limestone, displaying the general

* Notes on the Remains of Trilobites from South Australia. *Geol. Mag.*, 1884, iii., p. 342.

features of the organisms to advantage. The Wirrialpa specimens, on the contrary, from their similarity to the colour of the limestone are difficult to discern at a first glance, a difficulty which is increased by the large number of fragments present of the broken-up wall.

In the Ardrossan limestone the corals are usually seen in section, and show to advantage from the white colour of their walls and tissue as compared with the colour of the matrix. I have not examined any very complete individuals from this rock, and from its peculiar semi-conchoidal fracture it is not easy to obtain sections along any given well-defined line. A few weathered-out examples have been examined from Kanyka, and these have yielded good results, but in the majority of cases information has been gained chiefly through sections.

Measurements are rendered difficult from the various angles at which the corallums are naturally cut by the fracture or weathering of the matrix. Taking the specimens irrespective of genus, an imperfect corallum from Wirrialpa is one and three-quarter inches long, and another seen in section from Ardrossan measures one and a half inches in its longest diameter, slightly obliquely. An imperfect calyx from the former locality is one and a quarter inches in diameter, but others from the latter are much larger, although some which appear in transverse section in the limestone possess a diameter of half an inch or slightly more, and this is a common measurement. An example from Wirrialpa differs from most of the others in having a markedly oval section, the longest diameter being one inch and the shorter three quarters of an inch. A more perfect fragment from Kanyka, three quarters of an inch in length, has a diameter at one end of half an inch, and at the other measures three-eighths. A well-preserved little corallum in Prof. Tate's collection, three quarters of an inch in length, possesses a diameter of a quarter of an inch, and, judging from the number of the septa is the most rudimentary form I have seen.

From these figures we learn that the South Australian specimens, on the whole, are of less size than the Canadian *Archæocyathus*, although one or two examples are quite as tall as the former, but fall short in the diameter of their calices.* Similarly they are undoubtedly shorter than the type specimen of *Ethmophyllum*, *E. Whitneyi*, Meek,† in which the corallum reaches as much as six or more inches in length, and again shorter than the Spanish species of the last-named genus, *Ethmophyllum marianum*, Roemer‡, but the largest from Ardrossan, and the larger

*Bull. U.S. Geol. Survey, 1886, No. 30, p. 72.

†*Ibid*, t. 4, f. 1.

‡Lethæa Geognostica, Theil 1, Lethæa Palæozoica, 1 Lief., 1880, p. 301, f. 55a.

Wirrialpa specimens would seem to correspond well in diameter with the sectional figures of *Coscinocyathus* given by Dr. Bornemann.

Genus ETHMOPHYLLUM.

The specimens referred to this genus are small or of medium size, with a diameter of from a quarter to three quarters of an inch. The general form of our fossils is that of a long, slowly tapering, inverted cone, at times becoming turbinate, or rather cup-shaped, and circular or oval in section, with a large central tubular, or occasionally infundibuliform cavity. When the substance of the corals has weathered more rapidly than the infilling matrix, the latter is left projecting as a plug, giving to them a defined and characteristic appearance. The line of demarcation between this plug and the narrow external ring formed by the septa is a very marked one. In one of Prof. Tate's specimens the conate outline of the calice is clearly indicated by the plug of limestone infilling it. In weathered specimens free of matrix, the outer edges of the septa are usually visible as vertical lamellæ, when the resemblance to an ordinary decorticated Rugose coral is very strong. The outer covering, answering to the epitheca, has not been observed, but certain peculiar appearances here visible will be referred to later. Observation has not shown this to be other than a free form.

The minute anatomy resembles both that of *Archæocyathus* and *Ethmophyllum*, in possessing a well-marked septal area, always apparent in a transverse section (Pl. II., figs. 1-3) defined by an outer and inner lamina, bounding the outside and inside of the funnel-shaped corallum.

The septa in all our specimens are stout, rigid, and well marked lamellæ extending from the top to the bottom of the corallum, possessing, when viewed transversely, a general pillar-like appearance, and increasing by the interpolation of new septa, through the subdivision, or bifurcation of the older. The outer and inner ends of the septa in many instances are seen to expand more or less, where disrupted from the bounding laminæ, and when in this condition are not unlike the pillars of *Receptaculites* (Pl. II., fig. 4).

In *Archæocyathus* dissepiments are profusely developed, dividing the interseptal spaces into loculi, a character which is excellently shown in one of Dr. Hinde's figures. In *Ethmophyllum*, however, this dissepimental tissue is said to be apparently wanting, and the vast majority of the specimens before me agree with *Ethmophyllum* in this peculiarity (Pl. II., figs. 1 and 3). At the same time one section (Pl. II., fig 2) does exhibit simple, straight, transverse bars between the septa more or less in a line, dividing the loculi into rhomboidal spaces. These dissepiments, for such

must be their nature, are more prevalent near the outer margin of the septal area, and in places are much broken up, as if porous. On the whole, however, the general features of transverse sections of the septa are so essentially those of *Ethmophyllum*, as exemplified in Mr. C. D. Walcott's figure of *E. Whitneyi*, Meek,* Dr. Hinde's illustration of the same species,† and Prof. F. von Roemer's representation of the Spanish *E. marianum* ‡ that we must consider that the characters of the South Australian coral to be more in harmony with this genus than *Archæocyathus*.

The septa are very regular in appearance, of uniform width, and equi-distant, presenting in these particulars a strong contrast to the crowded and somewhat irregular condition in *Archæocyathus*. Furthermore they extend completely across the septal area, as figured by Dr. Hinde, Mr. Walcott, and von Roemer, and again, unlike those of *Archæocyathus*, do not stop short of the inner margin, curve round, and unite with one another.

It has proved difficult to ascertain the number of septa, owing to the imperfect condition of the calices, or the awkward angle at which the natural section of the coral has been fractured. A small specimen of Prof. Tate's possesses about twenty thick and widely separated septa (Pl. III., fig. 10), and this is the least number I have observed. Between twenty on the one hand, and forty-five, thirty-five, forty-nine on the other, but in some cases these do not represent the complete cycles, the specimens being imperfect. The septal area has an average width of from three to four millimetres, but is so frequently cut in oblique section that accurate measurements are difficult to obtain.

The structure of the septa and the inner and outer laminæ is usually very compact, dense, and homogenous, and it is seldom that any details can be made out. But in one horizontal section certain peculiar appearances are present, in the form of small, clear, circular spots in the substance of the septa, which can only be explained on the supposition that they are either vertical tubuli or pores passing through the septa obliquely. Another section, taken from a specimen from Wirrialpa, shows decided evidences of a secondary deposit in the form of a lining of clear calcite following the outline of each interseptal loculus, easily distinguished from the denser material of the septa, and with a more or less undulating margin (Pl. II., fig. 1).

The inner and outer lamina, or wall-plates, have exactly the same structure as the septa. The former is, however, much

* Bull. U.S. Geol. Survey, 1886, No. 30, t. 4, f. 1-1*h*.
† Quart. Journ. Geol. Soc., 1889, xlv., t. 5, f. 7.
‡ Lethæa Geognostica, *loc cit*, p. 300, f. 55*b*.

broken up, probably from its perforate nature, as described by Dr. Hinde, both in *Archæocyathus* and *Ethmophyllum*. The inner lamina, on the contrary, entirely departs from the *Archæocyathus*-type, and closely follows that of *Ethmophyllum*. In the former it is delicate, and directly "perforated by closely set circular apertures regularly arranged in quincunx." In the latter, however, this inner lamina "consists of a series of relatively large canals directed obliquely upward and inward, so that in transverse section they present the appearance of one or more rows of vesicles cut across." This is the fundamental difference between the two genera, and is precisely the structure we have presented in the South Australian fossils. In Pl. II., figs. 3 and 4, the septa will be seen to dissolve into a single, or at the utmost a double row of irregular or partially-preserved vesicles. It will, therefore, be apparent that the fossils now under description must be referred to *Ethmophyllum* rather than *Archæocyathus*.

Dr. Hinde describes the outer wall-plate as protected by an epithecal lamina, apparently non-perforate, in *Archæocyathus*; but mention is not made either of its absence or presence in *Ethmophyllum*. I have quite failed to detect any non-perforate epithecal layer, a point in which the present specimens resemble the Sardinian *Archæocyathus* examined by Dr. Hinde; this may be, however, a mere matter of preservation.

With the view of confirming the reference here made to *Ethmophyllum*, a comparison may advantageously be made of the cross section of the inner lamina-tubes of Pl. II., fig. 4, with Mr. Walcott's figure* of the same structure in *E. Whitneyi*; our illustration of dissepiments with his figure† of these divisions in the same species; and lastly, the secondary deposit investing the septa in Pl. II., fig. 1, with their clothed condition in another of the same author's figures‡ of *E. Whitneyi*.

In dealing with fragmentary material such as the present it is very difficult to limit the characters on which specific separation can be based, but it is possible that two species may be differentiated on the size, form, and number of the septa. For instance, the dissimilarity visible in the structure of Pl. III., fig. 10, with its small corallum and few and widely-separated septa, with that presented by Pl. II., figs. 2 and 3, may be specific; but so much variation in the number of the septa has been noted that, for the present, the specimens had better be regarded as forming one species only, under the name of *Ethmophyllum Hindei*.

As here defined *E. Hindei* has been found at Kanyka (Pl. II., fig. 2), the Blinman (Pl. II., fig. 3), and at Wirrialpa (Pl. II., fig. 1).

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* Bull. U. S. Geol. Survey, 1886, No. 30, t. 4, f. 1 *c*.
† *Loc. cit.*, t. 4, f. 1 *h*.
‡ *Loc. cit.*, t. 4, f. 1 *e*.

Genus COSCINOCYATHUS.

Associated with *Ethmophyllum Hindei*, at least one locality, are other fossils, usually more or less fragmentary, which possess, in addition to the structure common to both *Archæocyathus* and *Ethmophyllum*, the distinguishing features of *Coscinocyathus*, Bornemann.* This genus, according to Dr. Hinde, contains "turbinate, open saucer-shaped, or subcylindrical forms, resembling *Archæocyathus* in the character of the outer and inner wall-plates, and of the septa, but possessing in addition transverse cribriform plates, which subdivide the vertical interseptal loculi. These transverse plates, which may be compared to the tabulæ in fossil corals, only that they are perforate, extend quite across the space between the outer and inner laminæ of the wall, but they do not extend into the interior hollow cup. In some cases they are nearly horizontal, in others they are arched, or even oblique."

And here I may remark on the extraordinarily resemblance which exists between the lithological features of the Sardinian rock, with the appearance of its fossils when seen in section, and the Wirrialpa and Ardrossan limestones, so much so as almost to make one boldly assert that the limestones are identical.

The fossils, now referred to *Coscinocyathus*, are of larger size than the preceding, *Ethmophyllum*, with a greatly increased number of septa, usually in the form of portions of the septal area, straight or curved, or more or less irregularly shaped corallums, sometimes oval or oblong, similar to Bornemann's *C. cancellatus*;† or, at other times, semi-meandering masses, but the outline, as now seen, always more or less dependent on the angle at which the limestone is cut or fractured (Pl. III., fig. 1).

In a fragment of a large septal, area (Pl. III., fig. 7) tissue is visible between the septa, in every way answering to Dr. Hinde's description, and Bornemann's figures of *Coscinocyathus dianthus*‡ and *C. anthemis*.§ This specimen, which seems to conclusively prove the presence of this genus, is from Wirrialpa. In another specimen, which from the number of the septa, and their size, would also appear to be part of a *Coscinocyathus*, the outer wall plate (Pl. III., figs. 5 and 6) with its perforations is plainly visible. The pores are arranged in vertical alternating rows, from three to four between every two septa, and give rise to a roughly quincuncial arrangement. It also shows the increase in the number of septa by the interpolation of new ones. In

* Die Verst. Cambrischen Schichtensystems der Insel Sardinien, 1886, p. 59.
† *Loc. cit.*, t. 20, f. 2.
‡ *Ibid*, t. 17, f. 6 and 7.
§ *Ibid*, t. 21, f. 2.

another example from Wirrialpa (Pl. III., fig. 8) consisting of the inner ends of a few septa, there is also visible the inner perforated wall plate precisely similar to the parallel structure of *C. pandora*, Bornemann,* and *C. anthemis?* Bornemann.† Some portion of this tissue is also perceptible on the side of the end, or last septum, as a pellicle-like lining.

Identical characters can likewise be detected in a more perfect example in the richly-coloured Ardrossan limestone (Pl. III., fig. 3). This figure represents a partially oblique fractured section from the base upwards, cutting the interseptal tissue at more than one angle, and it further illustrates the dense nature of the corallum substance. On the upper side this specimen measures one and three-quarter inches by one and a quarter inches, the septal area varying from one to two-eighths of an inch in width. The inner perforated lamina, or wall-plate, is also visible (Pl. III,, figs. 2, 4, and 8). To this fossil I purpose applying the name of *Coscinocyathus Tatei*, in honour of Prof. Ralph Tate, F.L.S., of Adelaide University, to whose kindness I am indebted for an opportunity of describing these interesting fossils.

Genus PROTOPHARETRA.

This name was applied by Dr. Bornemann‡ to bodies from the Sardinian limestones, regarded by him as the "lower or vegetative state of development of forms of *Archæocyathus* and *Coscinocyathus*." Dr. Hinde, on the other hand, is not satisfied "that these fossils are merely the lower state of development of *Archæocyathus* forms," as very small specimens of both *Protopharetra* and *Archæocyathus* are present in the same hand specimens.

A detailed diagnosis of this genus has not been given by Bornemann, but Hinde describes it thus:—"It includes bodies of very varying forms, either cylindrical or growing in extended masses, from which simple or furiated stems are given off. The stems have a tube-like, axial cavity, crossed by tabulæ . . . and bounded by the porous walls. These consist of a delicate, fibrous, calcareous tissue, of dull, nearly opaque, milk-white aspect in thin sections. The fibres may be cylindrical or flattened, and they anastomose with each other . . . ."

The forms now referred to *Protopharetra* occur but sparingly at Kanyka, associated with *Ethmophyllum Hindei*, as round or oval, more or less cylindrical bodies, possessing a central cavity, surrounded by a zone of rather dense vermicular tissue, and when viewed with a low power closely resemble Bornemann's figures of *P. densa*§ and *P. radiata*.‖ The tubular cavity occupies but a

* *Loc. cit.*, t. 25, f. 2.
† *Ibid*, t. 24, f. 5.
‡ *Loc. cit.*, p. 46.
§ *Loc. cit.*, t. 8, f. 6 and 7.
‖ *Ibid*, t. 7, f. 1 and 2.

small space as compared with that of *Ethmophyllum* and *Coscinopora*, and in fact is not continuous longitudinally throughout the corallum. The figures represented in Pl. II., figs. 5 and 7, are taken from the same specimen, the latter with the centre filled by tissue from near the base of the corallum, and the former taken at a point much higher up, at points which in *Ethmophyllum* would be occupied by the inner and outer perforated laminæ, at the periphery and around the central cavity. The intermedial tissue consists of thickened irregular walls of granular calcite, enclosing oval or oblong spaces, or without regular form. In these walls a dense dark, and at times broken, line is visible (Pl. II., fig. 6), apparently of the nature of a primordial wall; the interspaces are all filled with clear calcite. A radial arrangement of the tissue is here and there visible, assuming a septa-like appearance as in *P. radiata*, Bornemann.* Towards the base of the cylinder the tubular cavity becomes filled with tissue, and that round the periphery enormously thickened (Pl. II., fig. 7). Tabulæ have not presented themselves to view. The fibrous structure of the walls is visible in Pl. II., fig. 6, and there are many other peculiar features which I am not at present prepared to explain. For instance, the so-called proper wall is broken through by pore-like channels of communication, without a corresponding piercing of the secondary fibrous thickening. In other places are a few pores or vertical canals cut across and filled with clear calcite.

The material before me is not sufficient in quantity for the proper elucidation of this form, but I propose to provisionally name it *Protopharetra (?) Scoulari*, in memory of one of the investigators of South Australian geology, hoping to return to a more detailed study of it at some future time.

Genus GIRVANELLA.

In 1878 Dr. H. A. Nicholson and the writer established† the genus *Girvanella* for flexuous or contorted microscopic tubuli, circular in section, and forming loosely compacted masses.

The tubes are apparently simple cylinders, without perforations and destitute of partitions. The tubes of the type species *G. problematica* are from 1-600th to 1-700th of an inch in diameter, twisted together in loosely reticulate or vermiculate aggregations of a rounded or irregular shape. *G. problematica* is characteristic of a Lower Silurian horizon in the South-East of Scotland, known as the Craighead Limestone. Dr. J. G. Hinde has shown,‡ however, that Dr. Bornemann has redescribed similar

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* *Loc. cit.*, t. 7, f. 1 and 2.
† Mon. Silurian Foss., Girvan in Ayrshire, 1878, fascie 1, p. 23.
‡ Geol. Mag., 1887, IV., p. 227.

bodies from the Sardinian Cambrian rocks as *Siphonema*, referring it to the calcareous Algæ!

The further history of *Girvanella* has been admirably worked out by Prof. H. A. Nicholson* and Mr. E. Wethered,† but it does not bear on the subject now before us.

In one of the sections of the limestone occur a number of vermiform bodies represented in Pl. II., fig. 8, consisting of tubes intertwined and crossing one another in all directions. Some are seen in longitudinal section, others obliquely so, and others again transversely. No absolutely clear connection can be traced between the tubes and the cavity of the *Ethmophyllum* or *Coscinocyathus* within which they are nestling. Without unduly asserting these tubes to be those of *Girvanella*, which they very closely resemble, and taking the whole circumstances into consideration, the identity is even probable, and I do not see any other solution of their structure. I have only studied them so far by means of thin sections prepared for the microscope, and even in this condition there are certain anomalous features difficult of explanation. Chief amongst these are the large circular tubes seen here and there, and which are certainly foreign to the structure of the original *Girvanella*, but the want of organic connection with either of the corals described renders it in my mind quite possible that the tubes may be those of *Girvanella*. The general appearance of this organism, when magnified, closely resembles that of *E. (Siphonema) incrustans*, Bornemann.‡

Geological Position.

So far as I am aware the age of the fossiliferous rocks at Kanyka and the Blinman has not been investigated [The siliceous limestones of the Flinders Range are known to overlie unconformably the metamorphic rocks which occupy the country to the eastward bordering on the New South Wales frontier.—Ed.], or at any rate published. As already pointed out, however, Mr. Otto Tepper, acting on the suggestion of Prof. Tate, has classed the Ardrossan limestone as Lower Silurian, a point later confirmed by Prof. Tate§ himself. Mr. Gavin Scoular, in his paper on "The Geology of the Hundred of Munno Para,"‖ states the age of the rocks forming the Adelaide chain and Munno Para Hills as Pre-Silurian. Again, Dr. Henry Woodward, when describing¶ the Trilobites found by Mr. Tepper, under the names of *Dolicho-*

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* *Ibid*, 1888, V., p. 22.
† *Ibid*, 1889, VI., p. 199.
‡ *Loc. cit.*, t. 2, f. 2.
§ Jour. R. Soc. S. Australia for 1883-84 (1885), VII., p. 76.
‖ *Ibid* for 1879-80 (1880), III., p. 110.
¶ Geol. Mag., 1884, III., p. 344.

metopus Tatei and *Conocephalites australis*, says they are "clearly of Lower Silurian age, being equivalent to the Swedish, Bohemian, Tasmanian, and North American beds with similar fossils." He refers later to the resemblance of these Trilobites to similar species described by myself from Tasmania* and by Prof. James Hall from the Potsdam sandstone of New York State. The Tasmanian beds I had already relegated to the horizon of the Potsdam, or its British equivalent; and the inference to be drawn from Dr. Woodward's remarks, although he simply says Lower Silurian, is to the same effect. Now the Potsdam Sandstone is Cambrian, and I think we may with all reason refer the Ardrossan marble to the same horizon, and by induction the Kanyka and Blinman beds also.

DESCRIPTION OF THE PLATES.

Plate II.

ETHMOPHYLLUM HINDEI, *sp. nov.*

Fig. 1. Portion of a transverse section of the septal area, showing the septa and the secondary deposit lining them. Wirrialpa

2. Nearly complete transverse section of a corallum, showing the general appearance and proportions of the parts, and the interseptal loculi traversed by a single line of dissepiment-like divisions. Kanyka × 1½.

3. Imperfect transverse section, with vesicular canals of the inner lamina of the septal area cut across. Blinman ... ... × 2.

4. Four septa of another example highly magnified, showing the foregoing structure in a more marked condition. Wirrialpa.

PROTOPHARETRA (?) SCOULARI, *sp. nov.*

5. Transverse section of a small corallum, with a central vacuity as in *Ethmophyllum*, but the septal arrangement lost in a mass of dense vermicular tissue. Kanyka ... ... × 3.

6. Highly magnified portion of the tissue, showing a ramifying primordial wall (?), surrounded by a dense secondary deposit, enclosing oval, oblong, or irregular spaces.

7. Transverse section of the same individual (fig. 5) taken from a lower position in the corallum, with the central vacuity filled by vermicular tissue, but the peripheral portion resolved into a septal area as in *Ethmophyllum* and *Coscinocyathus*. Kanyka ... ... × 3.

GIRVANELLA, *sp. ind.*

8. Portion of a section showing a number of vermiform bodies cut at various angles, which may be of the nature of this genus.

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* Papers and Proc. R. Soc. Tas. for 1882 (1883), p. 157.

Plate III.

COSCINOCYATHUS TATEI, *sp. nov.*

1. A mass of light grey to cream-coloured limestone with portions of the septal areas as cut at various angles. Wirrialpa. Nat.
2. Transverse section of a large corallum showing the septal area, and inner perforated lamina. Ardrossan. Nat.
3. The same example seen partly in oblique-horizontal, and partly oblique-vertical natural fractured sections, with the septal area, inner perforated lamina, and an external tissue, which may perhaps represent the outer perforated lamina. Ardrossan. Nat.
4. Three septa and inner perforated lamina of fig. 2 ... ... × 5.
5. Portion of a naturally weathered specimen, showing the outer ends of the septa seen longitudinally, covered by a portion of the outer perforated lamina. Kanyka. Nat.
6. Five septa of fig. 5 to show the interpolation of new septa by bifurcation, and the perforations of the outer lamina arranged in from three to four perforations to each septum ... ... × 3.
7. A small portion of the septal area of another specimen with remains of the cribriform interseptal tissue. Wirrialpa ... ... × 5.
8. Fragment of another example with the inner ends of six septa exposed and partially covered by the inner perforated lamina. Wirrialpa. × 2.

ETHMOPHYLLUM HINDEI, *sp. nov.*

9. Transverse section of a corallum. Wirrialpa. Nat.
10. A small weathered corallum seen partly horizontally, partly in vertical or longitudinal section, to show the central plug of matrix and limited number of septa. Kanyka ... ... × 2.

Descriptions of Australian Lepidoptera.

By E. Meyrick, B.A., F.E.S.

Part I.

[Read December 3rd, 1889.]

I have selected for the subject of this paper one of the families of the *Tineina*, which contains some of the largest and most characteristically Australian species of that group. The more specially developed genera are further remarkable through the curious habits of the larvæ, which have no parallel in any other family of the *Lepidoptera*. The perfect insects are often very retired in habit; and it is probable that when local collectors turn their attention more carefully to the discovery and rearing of the larvæ, many additional species will be found. It is the object of papers such as these to stimulate the search for these insects by enabling collectors to identify the species which they possess, and indicating the direction in which fresh investigations may be made.

XYLORYCTIDÆ.

Head smooth or with more or less loosely appressed hairs; ocelli absent; tongue developed. Antennæ $\frac{2}{3}$—$\frac{3}{4}$, in male pectinated, ciliated, or simple, basal joint without pecten. Labial palpi recurved, terminal joint pointed. Maxillary palpi very short, more or less appressed to tongue. Abdomen in male with uncus developed, variable in length. Forewings with vein 1 furcate towards base, 7 and 8 stalked or rarely separate or coincident, 11 from middle of cell. Hindwings as broad or generally broader than forewings, trapezoidal to ovate, 1*b* clothed with long hairs above towards base, shortly furcate at base, 3 and 4 from a point or stalked, 6 and 7 stalked or approximated towards base, 8 connected with upper margin of cell by a short bar.

Most related to the *Oecophoridæ*; probably the two families are parallel developments from a common source; they are analogous in many respects, but are easily separated by the neuration of the hindwings. None of the *Xyloryctidæ* possess the basal pecten of the antennæ, which is so common in the *Oecophoridæ*.

Whether this family is represented to any extent outside Australia, I am not at present able definitely to say. One species alone is found in New Zealand; it is an Australian insect, which has perhaps made its way thither within recent times. Perhaps some exotic forms described under the name of *Cryptolechia* are

to be referred here; but I am indebted to Lord Walsingham for pointing out that the original type of Zeller's *Cryptolechia* belongs in fact to the *Oecophoridæ*. It is therefore impossible to employ for this family the name *Cryptolechiadæ*, which I formerly used for it, and I have renamed it accordingly. It consists of a group of Australian genera which are intimately connected together; and even if it should be found hereafter that many South American and African forms are capable of being placed with them, they would probably not interrupt the close connection of the Australian genera, and any systematic change that might be necessary would perhaps be rather in the direction of a widening of the family characters.

The structure of the head is essentially identical with that of the *Oecophoridæ*. The neuration of the forewings is also identical in the typical forms, except that vein 2 is commonly much more widely remote from the angle of cell; but there is a wider range of structure, since there can be no question that the forms in which veins 7 and 8 are separate are rightly included. The hindwings are almost always relatively broader, and the neuration as described contains the essential points of distinction of the family; but I may say that the connecting bar between vein 8 and the cell, often very short when these are close together, is by no means so conspicuous a structure as might be supposed, and may very readily be passed over, especially when near the base; I have however satisfied myself that it is invariably present.

The following is a tabulation of the genera:—

1. Antennæ of male bipectinated. 2.
" ciliated or simple. 3.
2. Forewings with vein 7 absent (coincident with 8). 2. *Pilostibes.*
" " present. 3. *Cryptophaga.*
3. Hindwings with veins 6 and 7 separate. 4.
" " from a point or stalked. 8.
4. Thorax crested. 10. *Notosara.*
" smooth. 5.
5. Hindwings in male with long costal hair-pencil from base. 8. *Crypsicharis.*
" without costal hair-pencil. 6.
6. Terminal joint of palpi longer than second. 7. *Phthonerodes.*
" " not longer than second. 7.
7. Posterior tibiæ rough-haired. 9. *Lichenaula.*
" smooth-scaled. 6. *Catoryctis.*
8. Hindwings in male with very long costal hairs towards base. 9.
" without long costal hairs. 10.

9. Forewings with vein 7 absent (coincident with 8). 19. *Hypertricha*
" " present. 18. *Procometis*
10. Forewings with veins 7 and 8 separate. 21. *Agriophara*
" " stalked. 11.
11. Forewings with veins 3 and 4 stalked. 20. *Phylomictis.*
" " separate. 12.
12. Forewings with vein 7 to hind margin. 13.
" " apex or costa. 15.
13. Thorax crested. 13. *Tymbophora.*
" smooth. 14.
14. Antennal ciliations of male $1\frac{1}{2}$—2. 14. *Xylorycta.*
" " $\frac{1}{2}$. 15. *Telecrates.*
15. Posterior tibiæ smooth-scaled. 1. *Uzucha.*
" rough-haired. 16.
16. Abdomen stout, sides with dense projecting hairs. 4. *Maroga.*
" moderate, normal. 17.
17. Anterior tibiæ and tarsi much dilated with scales. 5. *Compsotorna.*
" " normal. 18.
18. Forewings with vein 7 to costa. 17. *Scieropepla.*
" " apex. 19.
" " $\frac{1}{4}$—$\frac{1}{2}$. 20.
19. Antennal ciliations of male 1. 11. *Clerarcha*
20. Hindwings with veins 6 and 7 from point, inner margin hairy. 12. *Plectophila.*
Hindwings with veins 6 and 7 moderately stalked, inner margin not hairy. 16. *Chalarotona.*

1. Uzucha, *Walk.*

Head with appressed scales; ocelli absent; tongue developed. Antennæ moderate, in male filiform, simple, basal joint very elongate, subclavate, without pecten. Labial palpi short, curved, ascending, second joint with loosely appressed scales, terminal joint short, smooth, acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen stout. Posterior tibiæ smooth-scaled. Forewings with vein 1 very long-furcate towards base, 2 from $\frac{3}{5}$, 3 from angle, 7 and 8 short-stalked, 7 to apex, 11 from middle. Hindwings over 1, subovate; 1*b* shortly furcate at base, with basal tuft of hairs, 3 and 4 from a point or short-stalked, 5 parallel to 4, 6 and 7 short-stalked, 8 connected with upper margin of cell at a point before middle.

A very distinct and curious genus; the peculiarly arched costa of the imago gives it a very Tortriciform appearance.

1. *Uz. humeralis*, Walk.

(Uzucha humeralis, Walk., 826.)

Male and female 42-61mm. Head dull orange-ochreous. Palpi dark fuscous, apex of second joint pale ochreous. Antennæ and thorax fuscous. Abdomen dark fuscous, base of segments and two whole apical segments ochreous-orange. Legs rather dark fuscous, apex of tarsal joints obscurely whitish-ochreous. Forewings oblong, slightly narrowed posteriorly, costa very strongly and abruptly arched near base, thence slightly arched or almost straight, apex obtuse, hindmargin nearly straight, hardly oblique, rounded beneath; fuscous, slightly purplish-tinged, sometimes reddish-tinged in disc; extreme costal edge pale reddish-ochreous; a semicircular dark reddish-fuscous spot on base of costa, margined posteriorly with pale reddish-ochreous; base of inner margin pale ochreous; a very small deep ferruginous or reddish-fuscous spot in disc at $\frac{2}{3}$; cilia fuscous, terminal half pale reddish-ochreous. Hindwings rather dark fuscous, apical $\frac{1}{4}$ pale ochreous-yellowish, division suffused; cilia pale ochreous-yellowish, becoming dark fuscous towards anal angle and on inner margin.

Duaringa and Brisbane, Queensland, in November; rather common in the larval state, but apparently less frequent as imago. Larva 16-legged, stout, cylindrical, head large; dull slaty-grey, spots small, blackish; head blackish; it feeds on the bark of *Eucalyptus*, gnawing it externally beneath a broad shelter of silk and refuse. Pupa in a chamber excavated in solid bark. I found the larva nearly full grown in September.

2. Pilostibes, n. g.

Head with appressed hairs; ocelli absent; tongue short. Antennæ moderate, in male shortly bipectinated throughout, basal joint moderate, rather swollen, without pecten. Labial palpi long curved, ascending, second joint thickened with dense scales, more or less rough or almost tufted towards apex beneath, terminal joint shorter than second, with appressed scales, acute. Maxillary palpi very short, appressed to tongue, Thorax smooth. Abdomen moderate. Interior tibiæ and tarsi thickened with dense scales; posterior tibiæ rough-haired above and beneath. Forewings with vein 1 long-furcate towards base, 2 from $\frac{3}{5}$, 3 from angle, 7 absent (coincident with 8), 8 to costa, 11 from middle. Hindwings $1\frac{1}{4}$, oblong-ovate; base below median, and inner margin clothed with long hairs, 1*b* shortly furcate at base, 3 and 4 from a point or stalked, 5 parallel to 4, 6 to 7 from a point or short-stalked, 8 connected with upper margin of cell at a point before middle.

Certainly a development of *Cryptophaga*.

Forewings with dark reddish-fuscous central spot. 2. *stigmatias*.
" without such spot. 3. *enchidias*.

2. *Pil. stigmatias*, n. sp.

Female 44-46mm. Head and palpi brown, terminal joint fuscous-whitish. Antennæ brownish, more whitish towards base. Thorax whitish-brown, with a blackish-fuscous transverse anterior spot. Abdomen whitish-fuscous, with a ferruginous band before middle, anal segment dark fuscous above. Legs brown. Forewings elongate-oblong, costa moderately arched, apex obtuse, hindmargin straight, rather oblique; pale brownish-ochreous irrorated with dark fuscous, costal half suffused with ochreous-brown; a moderate transverse oblong-oval very dark reddish-fuscous slenderly whitish-margined central spot, lower extremity becoming black and produced into a slender acute outwardly oblique tooth: cilia whitish-fuscous irrorated with ochreous-brown, with a fuscous subbasal and apical ferruginous line. Hindwings fuscous, lighter towards base; a darker hind-marginal line; cilia fuscous-whitish.

Newcastle, New South Wales; two specimens (Austr. Mus.).

3. *Pil. enchidias*, n. sp.

Male 32mm. Head whitish-ochreous. Palpi brownish-ochreous, terminal joint and apex of second white. Antennæ brownish-ochreous. Thorax pale ochreous, mixed on back with blackish. Abdomen whitish-ochreous. Legs ochreous-whitish, anterior pair suffused with dark fuscous internally. Forewings elongate, moderate, costa moderately arched, apex pointed, hindmargin sinuate beneath apex, oblique, rounded beneath; whitish-ochreous; a strong fuscous longitudinal streak, mixed with blackish, from base below costa to disc before middle, with two short oblique teeth from its upper edge, and its apex connected by a short line with an oblique linear blackish dot in disc beyond middle; a short blackish longitudinal dash beneath apex of this streak; a fine blackish line inner margin from $\frac{1}{3}$ to anal angle: cilia whitish, with a strong blackish line near base, tips fuscous-tinged at anal angle and blackish at apex. Hindwings whitish-yellowish; cilia white.

Newcastle and Sydney, New South Wales; in November, two specimens.

3. Cryptophaga, Lw.

Head with appressed hairs; ocelli absent; tongue short. Antennæ moderate, in male bipectinated throughout or nearly, basal joint moderate, swollen and densely scaled above, without pecten. Labial palpi moderately long, curved, ascending, second joint with dense appressed scales, somewhat rough beneath, terminal joint shorter than or rarely as long as second, smooth or slightly roughened anteriorly, acute or tolerably pointed. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen stout, sides more or less clothed with dense projecting hairs

or scales. Anterior and middle tibiæ densely rough-scaled, anterior tarsi slightly thickened with scales, posterior tibiæ densely rough-haired above and beneath. Forewings with vein 1 long-furcate towards base, 2 from $\frac{2}{3}$–$\frac{5}{6}$ or rarely almost from angle, 3 from angle, 7 and 8 stalked, 7 to hindmargin, 11 from middle. Hindwings over 1, oblong-ovate; towards base below median, and towards inner margin densely clothed with long hairs, vein 1*b* shortly furcate at base, 3 and 4 from a point or short-stalked, 5 parallel to 4, 6 and 7 from a point or short-stalked or rarely separate but closely approximated at base, 8 connected with cell at a point towards base.

The name of this genus is printed *Cryptophasa* by Lewin, but the second part of this word is meaningless, whilst the habits of the larvæ show clearly that Lewin intended the name as I have written it; I have therefore made the correction. No confusion need occur with the Coleopterous genus *Cryptophagus*, since the different termination is a sufficient distinction.

The genus is distinguished from all but *Pilostibes* by the pectinated antennæ of the male. In most of the species the larvæ excavate tunnels into the solid wood of trees, within which they reside, closing the entrance with a barricade of silk and refuse; from these they emerge by night and bite off entire leaves, which they drag into the burrow for food. The barricade is evidently intended not to conceal the entrance, for it is rather conspicuous, but as a bulwark against ants, which are the worst enemies of all larvæ. These large larvæ are not only a favourite food of the natives, but are also frequently eaten by whites, either raw or roasted, and are much esteemed by those who can get over early prejudices. The peculiar habits are, however, not invariable in the genus, and some of the smaller species show still those simpler and more usual methods of life, from which this more elaborate system has been developed.

The perfect insects are in general rarely met with at large, although the larvæ are often common. I believe the species flourish in the drier districts, where other *Lepidoptera* are scarce; and it is probable that judicious research will hereafter largely add to their number.

1. Hindwings yellow, orange, or ocherous. 2.
   " not " " " 5.
2. Forewings with ground colour white. 9. *porphyrinella*.
   " " " not white 3.
3. Forewings without marking. 16. *phaëthontia*.
   " with darker markings. 4.
4. Forewings with base of cilia spotted with black. 20. *rubra*.
   " " " not " " 15. *rubescens*.

5. Hindwings brown-reddish. 17. *russata.*
" not " 6.
6. Hindwings wholly white, except sometimes hindmarginal dots. 7.
" not wholly white 11.
7. Forewings with three large, black, discal dots. 8.
" without " " " 9.
8. Abdomen partially blackish 25. *delocentra.*
" not " " 24. *Pultenaeæ*, female (part).
9. Forewings with yellowish line along submedian fold. 18. *flavolineata.*
" without " " " " " 10.
10. Forewings irrorated with black 14. *spilonota.*
" not " " " 19. *epadelpha.*
11. Hindwings partially white. 12.
" not " " 17.
12. Hindwings blackish or dark grey towards base. 13.
" white towards base. 15.
13. Forewings with ground colour white. 14.
" " " " whitish-ochreous. 21. *lurida.*
14. Forewings with grey hindmarginal fascia. 11. *albicosta.*
" without " " " 24. *Pultenaeæ*, male.
15. Hindwings with coppery-purple hindmarginal fascia. 10. *ecclesiastis.*
" without " " " 16.
16. Forewings grey. 13. *leucadelpha.*
" white. 24. *Pulteaenæ*, female (part).
15. Forewings with ground colour white 4. *hierastis.*
" " " " not white. 18.
18. Forewings with white costal streak. 8. *proleuca.*
" without " " " 19.
19. Forewings pale greyish-ochreous 22. *sarcinota.*
" grey or fuscous. 20.
20. Abdomen with well-defined red band near base. 23. *balteata.*
" without " " " " " 21.
21. Abdomen dark fuscous. 22.
" fuscous-whitish 23.
22. Forewings, with transverse black lines. 7. *epigramma.*
" without " " " 12. *irrorata.*
23. Forewings with three darker discal dots; vein 2 from near angle. 5. *dolerastis.*
" " about seven " " ; vein 2 from $\frac{2}{3}$ of cell. 6. *stochastis.*

4. *Crypt. hierastis*, n. sp.

Female 22-23mm. Head, palpi, antennæ, thorax, and abdomen white; posterior extremity of thorax greyish. Legs dark fuscous, posterior tibiæ white. Forewings elongate, costa gently arched, apex rounded, hindmargin obliquely rounded; 2 from near angle; glossy snow-white; a narrow dark fuscous streak along costa from before middle to apex, finely attenuated anteriorly; a moderate dark fuscous streak along inner margin from near base to anal angle: cilia white, at apex and towards anal angle fuscous-grey. Hindwings with veins 6 and 7 from a point; light fuscous, hindmarginal edge darker; cilia white.

York, West Australia; three specimens bred in December. The larva feeds on *Hakea* (an unidentified species with leaves metamorphosed into stout spines), making long contorted tubes of silk covered with refuse amonst the twigs, in October.

5. *Crypt. dolerastis*, n. sp.

Male 31mm. Head and thorax grey. Palpi grey-whitish, irrorated with dark-grey. Antennæ grey-whitish. Abdomen ochreous-grey-whitish. Legs dark fuscous irrorated with whitish, posterior tibiæ whitish. Forewings elongate, moderate, costa gently arched, slightly sinuate beyond middle, apex obtuse, hindmargin obliquely rounded; 2 from near angle; light ashy-grey, irrorated with dark-grey; a cloudy dark-grey dot in disc at $\frac{2}{5}$, traces of a second beneath it, and a third, larger but ill-defined, in disc at $\frac{4}{5}$; a very indistinct transverse darker shade at $\frac{5}{6}$; a hindmarginal series of blackish dots: cilia light grey. Hindwings with veins 6 and 7 from a point; fuscous, becoming paler and more whitish towards base; cilia whitish, with a dark-grey line.

Geraldton, West Australia; one specimen bred, which emerged some months after my return to England. Larva 16-legged, cylindrical, with short, scattered, blackish hairs; grey, irregularly tinged with reddish and greenish, becoming dull greenish beneath; spots small, whitish; head dark brown, marbled with whitish-ocherous; feeds on *Banksia* (an unidentified species with leaves 3 to 4 inches long, oblong-linear, margins serrate, apex emarginate), amongst the spun-together leaves of terminal shoots, in October. This larval habit, reminding one of the *Tortricina*, is quite exceptional in the genus. The species is closely similar to the following, but differs in shape of wing and neuration, as well as in details of marking.

6. *Crypt. stochastis*, n. sp.

Both sexes 27-33mm. Head grey-whitish. Palpi whitish, sprinkled with dark grey. Antennæ whitish, pectinations in male whitish-ochreous. Thorax grey-whitish, posteriorly greyer, posterior extremity mixed with blackish. Abdomen fuscous-whitish.

Legs dark fuscous irrorated with whitish, posterior tibiæ whitish above. Forewings elongate, moderate, costa gently arched, apex rounded, hindmargin rather obliquely rounded; 2 from $\frac{2}{3}$; ashy-grey, thinly sprinkled with blackish; a dark grey dot near base in middle; about five indistinct cloudy dark-grey dots in a longitudinal series in disc from $\frac{1}{4}$ to $\frac{3}{4}$, the last subcrescentic; a small cloudy subquadrate dark-grey spot beneath fourth dot, sometimes connected indistinctly with third: cilia ashy-grey. Hind-wings with veins 6 and 7 from a point or short-stalked; fuscous, base paler and whitish-tinged; cilia fuscous, tips and a row of median points whitish.

York, West Australia; four specimens bred in December. Larva feeds on *Hakea* (the same species as *C. hierastis*), living in a barricaded tunnel and carrying in the spines for food, in October.

7. *Crypt. epigramma*, n. sp.

Female 34mm Head, antennæ, and thorax dark fuscous. Palpi whitish, irrorated with dark fuscous. Abdomen dark-grey, mixed with orange-reddish towards base of segments. Legs dark fuscous, apex of joints whitish, posterior tibiæ grey-whitish. Forewings oblong, costa moderately arched on basal half, thence straight, apex obtuse, hindmargin sinuate beneath apex, not oblique, rounded beneath; 2 from $\frac{2}{3}$; dark ashy fuscous; veins more or less distinctly marked with fine black lines; a narrow blackish streak along basal third of inner margin; a fine transverse black line from $\frac{1}{4}$ of costa, terminated by median vein; a second similar line from costa before middle, reaching $\frac{3}{4}$ across wing: cilia dark ashy fuscous. Hindwings with veins 6 and 7 from a point; fuscous, darker towards hindmargin; cilia fuscous-whitish, with a dark fuscous subbasal line.

Mount Lofty, South Australia; one specimen taken by Mr. E. Guest.

8. *Crypt. proleuca*, n. sp.

Male 19 mm. Head and palpi ochreous-whitish, slightly sprinkled with ferruginous. Antennæ fuscous, mixed with whitish. Thorax ochreous-whitish, irrorated with brown. Abdomen whitish-ochreous, posterior margin of segments bright orange. Legs ochreous-fuscous, middle and posterior tibiæ whitish. Forewings oblong, costa slightly arched, apex rounded, hind margin oblique, slightly rounded; 2 from $\frac{3}{4}$; fuscous, towards inner and hind margin sprinkled with whitish and dark fuscous; a moderate sharply-marked snow-white streak along costa from near base to $\frac{5}{6}$, attenuated anteriorly to a point, beneath bordered by a broad ochreous-brown band from base to $\frac{3}{4}$; an ill-defined small roundish dark fuscous spot beneath middle of disc, suffusedly

margined with whitish, and a second, unmargined, in disc at $\frac{1}{2}$: cilia fuscous, base sprinkled with white. Hindwings with veins 6 and 7 separate; fuscous, rather darker posteriorly; cilia whitish, with a subbasal dark fuscous line.

Quorn, South Australia; one specimen in October.

9. *Crypt. porphyrinella*, Walk.

(*Cryptolechia porphyrinella*, Walk. 771.)

Female 29 mm. Head and thorax white, sides of face dark fuscous. Palpi white, second joint dark fuscous except apex. Antennæ dark fuscous. Abdomen ochreous-yellow. Legs deep ochreous-yellow, anterior pair dark fuscous. Forewings elongate, moderate, posteriorly somewhat dilated, costa gently arched, apex rounded, hind margin somewhat oblique, gently rounded; 2 from $\frac{2}{3}$; white; a broad, straight, dark purple-fuscous longitudinal median streak from base of costa, dilated towards posterior extremity so as to extend on hind margin from above middle to anal angle, upper edge with a broad triangular projection before middle; a rather narrow purple-blackish fascia along hind margin from apex to beneath anal angle, marked with seven small semi-oval golden-ochreous spots on hind margin: cilia rather dark grey, basal half whitish with a broad black subbasal line. Hindwings with veins 6 and 7 separate; ochreous-yellow; a narrow dark fuscous streak along upper half of hindmargin, dilated at apex; cilia ochreous-yellow, round apex grey with a black subbasal line.

Newcastle and Sydney, New South Wales, in February; two specimens.

10. *Crypt. ecclesiastis*, Meyr.

(*Cryptophasa ecclesiastis*, Meyr., Proc. Linn. Soc. N. S. Wales, 1886, 1040.)

Female 66 mm. Head and thorax white. (Palpi broken.) Antennæ fuscous. Abdomen white, above with a broad black transverse band before middle, and five slender black rings between that and apex, apical scales yellowish-tinged. Legs white, anterior and middle tibiæ banded with black, all tarsi black with white rings. Forewings elongate-oblong, costa bent before middle, apex rounded, hind margin rather oblique, hardly rounded; 2 from $\frac{2}{3}$; shining white; a narrow coppery hind marginal fascia, forming alternate purple and golden spots: cilia white, barred with dark fuscous. Hindwings with vein 6 and 7 from a point; shining white; a narrow coppery-purplish hindmarginal fascia; cilia white.

Fernshaw, Victoria; one specimen.

11. *Crypt. albicosta*, Lw.

(*Cryptophasa albacosta*, Lw., Ins. N. S. Wales, Z. Linn. Ent. IX., 350 [rect. *albicosta*].)

Both sexes 40-56 mm. Head, antennæ, and thorax white; antennal pectinations of male pale ochreous. Palpi white, base dark fuscous above. Abdomen rather dark grey, sides, apex, and segmental margins white. Legs white, anterior tarsi dark fuscous with white rings. Forewings oblong, posteriorly slightly dilated, costa slightly arched, apex rounded, hind margin hardly oblique, nearly straight, rounded beneath; 2 from $\frac{3}{4}$; shining white; a very large subtriangular grey blotch, more or less suffused with ochreous-brown and sprinkled with black, resting on inner margin from before $\frac{1}{3}$ to $\frac{5}{6}$, its apex nearly touching costa near base; a minute black grey-circled dot in disc at $\frac{4}{5}$, resting on posterior margin of blotch; a grey sometimes white-centred reniform spot in disc at $\frac{3}{4}$; a more or less developed grey fascia from middle of disc, and another from beyond reniform spot, not rising above it, confluent below it and running into posterior angle of blotch, variable in breadth, rarely broadened to coalesce with hindmarginal fascia; a moderate light grey hindmarginal fascia, including a brownish-ochreous hindmarginal line, preceded by a row of black dots circled with ochreous-whitish: cilia whitish, with an ochreous-fuscous subbasal and paler grey posterior line. Hindwings with veins 6 and 7 from a point or short-stalked; rather dark fuscous-grey; a cloudy white streak along upper half of hindmargin, dilated into a spot at apex; cilia white.

Newcastle and Sydney, New South Wales; Melbourne, Victoria; Georges Bay, Tasmania; bred in November and December rather commonly, but not taken at large. Larva 16-legged, rather stout, wrinkled, cylindrical, with long scattered whitish hairs, head with two blunt spines on forehead, and other shorter ones towards mouth, second segment large; grey-whitish, finely wrinkled transversely with blackish-grey, segmental divisions suffused with dark grey; segments 5-12 with a transverse elongate brownish-red dorsal spot towards anterior margin, interrupted in middle, an oblong-ovate oblique brownish-red spot on side, spiracles black, a slender longitudinal black wrinkled subspiracular line, beneath which are three smaller ochreous-red spots in an inverted triangle, two upper ovate, lower more elongate; fourth segment with dorsal spot much smaller, two other very small spots behind it, and an irregularly double spot on side before spiracles, besides the other lateral spots; third segment with a large irregular ochreous-reddish spot on each side of back posteriorly, a similar one below it anteriorly, and usual lateral spots; second segment reddish-ochreous-brown; head

black; anal segment brownish-ochreous. Feeds on *Banksia serrata*, *Ceratopetalum gummiferum*, and *Callicoma serratifolia*, residing in a barricaded tunnel in the branches and carrying in leaves for food, from September to December. Although the foodplants are of very remote Natural Orders, it is unquestionably the same species which feeds on these apparently very different foods.

12. *Crypt. irrorata*, Lw.

(*Cryptophasa irrorata*, Lw., Ins. N. S. Wales.)

Both sexes 43-58mm. Head and thorax grey, or whitish mixed with grey, more or less sprinkled with dark fuscous. Palpi whitish, sprinkled with dark fuscous. Antennæ grey-whitish, pectinations in male ochreous. Abdomen rather dark fuscous. Legs dark fuscous, sprinkled with whitish. Forewings oblong, posteriorly slightly dilated, costa in male straight, in female gently arched, apex rounded, hind margin somewhat oblique, gently rounded; 2 from $\frac{2}{3}$; grey, more or less sprinkled with ferruginous and brown, and coarsely irrorated with black; a small darker spot in disc before middle, and a second beneath first; an obscure pale dark-margined reniform spot in disc at $\frac{2}{3}$, connected with costa beyond middle by an indistinct streak; a row of more or less marked dark fuscous spots along hind margin and posterior half of costa: cilia fuscous-grey, with two darker lines. Hindwings with veins 6 and 7 from a point or short-stalked; rather dark fuscous; cilia whitish, with a fuscous line, and indistinct traces of fuscous bars.

Newcastle and Sydney, New South Wales; Melbourne and Warragul, Victoria; bred tolerably commonly in December. Larva 16-legged, stout, cylindrical, with scattered long whitish hairs, second segment large; dull white, segmental divisions blackish; segments 5-12 each with a slender black transverse central wrinkle, two elongate-oval transverse ochreous-red spots on back near anterior margin, some scattered black depressed dots, forming short longitudinal lines on sides above spiracles, an oblique-oval ochreous-red spiracular spot bordered beneath by a blackish mark, and three roundish ochreous-red spots placed in an inverted triangle below spiracles; fourth segment with dorsal spots much smaller and more remote, each followed by a slender oblique-transverse blackish line, lateral spots as usual, but upper anterior of subspiracular spots much larger and approximated to spiracular; third segment similar to fourth, but with two additional elongate-oval transverse ochreous-red spots on back near posterior margin; second segment whitish, anteriorly brownish-tinged, with a broad dark fuscous irregular median band, attenuated beneath, interrupted on back; head blackish, with two short blunt prominences on forehead, and other smaller ones

towards mouth; twelfth segment with two additional small ochreous-red spots on back on posterior margin; and segment whitish, speckled with black: feeds on *Casuarina suberosa*, residing in a barricaded tunnel in main branches, and carrying in twigs for food, in November.

13. *Crypt. leucadelpha*, Meyr.

(*Cryptophasa leucadelpha*, Meyr., Proc. Linn. Soc., N.S. Wales, 1886, 1040.)

Both sexes 41-46mm. Differs from preceding only as follows:—Abdomen grey-whitish; hindwings white, with moderately broad suffused fuscous hind marginal fascia not reaching anal angle.

Wimmera, Victoria; two specimens. Larva feeds on *Casuarina*.

14. *Crypt spilonata*, Scott.

(*Cryptophasa spilonata*, Scott, Austr. Lep. 10, pl 3.)

Female 45mm. Head, palpi, antennæ, thorax, abdomen, and legs white; anterior tarsi with base of four apical joints dark grey. Forewings oblong, posteriorly dilated, costa gently arched, apex obtuse, hind margin sinuate, hardly oblique, rounded beneath; 2 from $\frac{2}{3}$; pale whitish-grey, slightly fuscous-tinged, irrorated with black; traces of a small darker spot in disc at $\frac{3}{5}$: cilia whitish. Hindwings with veins 6 and 7 from a point; white; cilia white.

Newcastle and Sydney, New South Wales; two specimens bred in November. Larva residing in a barricaded tunnel in branches of *Banksia serrata*, carrying in leaves for food, in October.

15. *Crypt. rubescens*, Lw.

(*Cryptophasa rubescens*, Lw., Ins. N.S. Wales.)

Male 45mm. Head ochreous-white. Palpi white, second joint reddish-tinged above. Antennæ ochreous, base white. Thorax reddish-ochreous, anteriorly rosy-tinged. Abdomen and legs ochreous-orange, anterior legs ochreous-reddish. Forewings oblong, posteriorly slightly dilated, costa slightly arched, apex obtuse, hind margin slightly sinuate, hardly oblique, rounded beneath; 2 from $\frac{2}{3}$; ferruginous, irrorated with elongate light brownish-ochreous scales; costa broadly suffused with pale ochreous from base to beyond middle, attenuated to a point posteriorly; a short obscure dark fuscous dash or submedian fold at $\frac{1}{4}$, and another beyond middle; a small roundish ill-defined dark fuscous spot in disc at $\frac{2}{5}$, and another at $\frac{3}{4}$, more elongate: cilia ferruginous. Hindwings with veins 6 and 7 from a point or short-stalked; ochreous-orange, somewhat paler posteriorly; cilia light orange, becoming ferruginous around apex.

Duaringa and Brisbane, Queensland; Newcastle and Sydney, New South Wales; bred not uncommonly in November. Larva

rying in the phyllodia for food, in August and September.

16. *Crypt. phaëthontia*, n. sp.

Female 41mm. Head, palpi, antennæ, thorax, and legs ochreous-reddish. Abdomen whitish-ochreous irrorated with reddish. Forewings elongate, moderate, costa moderately arched, apex obtuse, hind margin not oblique, rounded beneath; 2 from $\frac{3}{4}$; deep brown-reddish; cilia dark reddish-fuscous. Hindwings with veins 6 and 7 from a point; pale ochreous, slightly reddish-tinged; cilia pale ochreous, reddish-tinged, tips obscurely whitish.

Duaringa, Queensland; one specimen received from Mr. G. Barnard.

17. *Crypt. russata*, Butl.

(*Cryptophasa russata*, Butl., Proc. Zool, Soc., 1877, 475.)

Male 33mm. Head white. Thorax deep brown-red, anteriorly whitish. Abdomen brown-reddish. Forewings elongate, moderate, costa slightly arched, apex obtuse, hind margin slightly rounded, somewhat oblique; deep fuscous-red, somewhat lighter towards costa; a white streak along costa from base to $\frac{2}{3}$, posteriorly attenuated. Hindwings brown-reddish.

Cape York, Queensland; one specimen in the British Museum, from which this diagnosis is taken, Butler's original description being in part erroneous.

18. *Crypt. flavolineata*, Walk.

(*Cryptolechia flavolineata*, Walk., 749.)

Female 50mm. Head and palpi white. Antennæ white, base of stalk yellowish. Thorax white, with a central longitudinal yellow line. Abdomen white, second segment dull brown-red. Legs white, anterior and middle tibiæ ochreous-yellow above. Forewings oblong, posteriorly rather dilated, costa gently arched, apex obtuse, hindmargin straight, slightly oblique, rounded beneath; 2 from $\frac{2}{3}$; snow-white; a faint pale yellowish central longitudinal line from before middle of disc almost to hind margin; a suffused ochreous-yellow line along submedian fold from base to anal angle; a short slender ochreous-yellow streak along inner margin about $\frac{1}{3}$: cilia white, terminal half ochreous-yellow. Hindwings with veins 8 and 5 from a point; snow-white; cilia white.

Sydney, New South Wales, in October; one specimen. I suspect the larva to feed on *Eucalyptus*.

19. *Crypt. epadelpha*, n. sp.

Female 45mm. Head, palpi, antennæ, and thorax white. Abdomen white, second segment dull orange-red. Legs white, anterior tarsi with base of four apical joints blackish. Forewings

oblong, somewhat dilated posteriorly, costa moderately arched, apex obtuse, hindmargin rounded, somewhat oblique; 2 from $\frac{2}{3}$; snow-white; a hindmarginal series of small black dots: cilia white. Hindwings with veins 6 and 7 from a point; snow-white; upper half of hindmargin marked with blackish dots; cilia white.

Brisbane, Queensland; one specimen bred in November. Larva residing in a barricaded tunnel in branches of *Tristania conferta*, carrying in leaves for food, in September.

20. *Crypt. rubra*, n. sp.

Male 50mm, Head pale ochreous, crown reddish. Palpi whitish-ochreous, base reddish-fuscous. Antennæ fuscous. Thorax ochreous-red. Abdomen pale ochreous, second segment dull red. Legs whitish-ochreous, banded with black. Forewings oblong, posteriorly slightly dilated, costa slightly arched, apex obtuse, hind margin rather obliquely rounded; 2 from $\frac{5}{6}$; ochreous-red, deeper towards costa and inner margin anteriorly; a dark fuscous dot in disc beyond $\frac{1}{3}$, a second on fold beneath middle, a third in disc at $\frac{2}{3}$, and a fourth between second and third: cilia grey, with a red basal line, basal half spotted with black. Hindwings with veins 6 and 7 short-stalked; pale yellowish-ochreous, apex slightly reddish-tinged; cilia whitish-ochreous.

Ardrossan, South Australia; one specimen in November.

21. *Crypt. lurida*, n. sp.

Female 58mm. Head, palpi, and thorax whitish-ochreous. Antennæ blackish. Abdomen blackish, sides of segments white at base, second segment dull red on back, anal segment whitish-ochreous. Legs whitish-ochreous, tarsi black with white rings on apex of joints. Forewings oblong, posteriorly somewhat dilated, costa moderately arched, apex obtuse, hindmargin rather obliquely rounded; 2 from $\frac{4}{5}$; whitish-ochreous, towards inner margin anteriorly slightly brownish-tinged; a black dot in disc at $\frac{1}{3}$, a second on fold beneath middle, and two others obliquely transversely placed in disc at $\frac{2}{3}$, lower anterior: cilia whitish-ochreous, with a basal row of black dots. Hindwings with veins 6 and 7 from a point; white; basal half blackish, division suffused; cilia white, on anal angle and inner margin blackish.

Mount Lofty, South Australia; one specimen received from Mr. E. Guest. Larva residing in a barricaded tunnel in stems of *Eucalyptus viminalis* ("white gum"), carrying in leaves for food.

22. *Crypt. sarcinota*, n, sp.

Both sexes 35-53mm. Head and thorax whitish-ochreous. Palpi white, second joint dark fuscous above towards base. Antennæ in male fuscous, in female whitish. Abdomen blackish, sides and segmental margins ochreous-whitish, basal and apical

Legs ochreous-whitish, tarsal joints black towards base. Forewings oblong, posteriorly slightly dilated, costa slightly arched, apex obtuse, hindmargin straight, rather oblique; 2 from $\frac{4}{5}$; pale greyish-ochreous, brownish-tinged; a large black dot in disc at $\frac{1}{3}$, a second on fold beneath middle, and two others transversely obliquely placed, and sometimes connected by a fine line in disc at $\frac{3}{5}$, lower anterior; a row of black dots along hindmargin and apical half of costa: cilia pale greyish-ochreous, basal half barred with blackish on hindmarginal dots. Hindwings with veins 6 and 7 from a point or short-stalked; fuscous, tinged with blackish towards basal third, base with ochreous-whitish hairs; cilia whitish-fuscous, with a blackish-grey line near base, in female on upper half of hindmargin reduced to a row of dots.

Duaringa, Queensland; several specimens received from Mr. G. Barnard.

23. *Crypt. balteata*, Walk.

(*Zitua balteata*, Walk. Suppl., 1841.)

Male 28-32mm. Head and palpi whitish-ochreous. Antennæ blackish. Thorax whitish-ochreous, becoming fuscous posteriorly. Abdomen blackish, second segment orange-red above, anal segment pale ochreous. Legs whitish-ochreous, tarsi and posterior tibiæ black with white apical rings. Forewings oblong, costa slightly arched, apex obtuse, hindmargin obliquely rounded; 2 from $\frac{5}{6}$; dark fuscous-grey; a black dot in disc beyond $\frac{1}{3}$, a second on fold beneath middle, and two others obliquely transversely placed in disc at $\frac{3}{5}$, lower anterior: cilia dark grey, with a basal series of black spots. Hindwings with veins 6 and 7 from a point; dark fuscous, basal half blackish; cilia light fuscous with a dark fuscous basal line, towards anal angle blackish.

Mount Lofty, South Australia; two specimens received from Mr. E. Guest. Larva residing in a barricaded tunnel in stems of *Eucalyptus* ("stringy-bark"), carrying in leaves for food.

24. *Crypt. Pultenaeæ*, Lw.

(*Cryptophasa pultenaeæ*, Lw., Ins. N. S. Wales).

Both sexes 26-37mm. Head, palpi, antennæ, and thorax white; terminal joint of palpi $\frac{2}{3}$ of second. Abdomen white, second segment orange-red. Legs black, ringed with white, middle and posterior tibiæ white. Forewings oblong, posteriorly somewhat dilated, costa gently arched, apex obtuse, hindmargin slightly oblique, somewhat rounded; 2 from $\frac{2}{3}$; shining snow-white; a black dot in disc at $\frac{1}{3}$, and two others transversely placed in disc at $\frac{3}{5}$, lower somewhat posterior; a row of small black spots along hindmargin and apical fourth of costa: cilia white. Hindwings with veins 6 and 8 from a point; in male blackish, hindmargin

black spots; cilia white.

nd Sydney, New South Wales; several specimens, r to February. Larva residing in a barricaded s of *Pultenaea villosa*, carrying in leaves for food.

25. *Crypt. delocentra*, n. sp.

n. Head whitish-ochreous. Palpi white, terminal nd. Antennæ black. Thorax white, anteriorly l. Abdomen blackish, sides and segmental mar- asal segment white, second segment orange-red. nged with white. Forewings oblong, posteriorly d, costa gently arched, apex obtuse, hindmargin y rounded; 2 from $\frac{3}{4}$; shining snow-white; a large isc beyond $\frac{1}{3}$; and two others transversely placed wer rather posterior; a row of small black spots gin and apical fourth of costa: cilia white. Hind- ns 6 and 7 from a point; snow-white; a hindmar- all black spots; cilia white, basal half indistinctly rk fuscous on hindmarginal spots.

South Wales; one specimen bred in December. in a barricaded tunnel in young branches of *gummiferum*, carrying in leaves for food, in

4. MAROGA, *Walk.*

ppressed scales; ocelli absent; tongue short. An- e, in male flatly dentate or filiform, shortly ciliated somewhat swollen, without pecten. Labial palpi g, curved, ascending, second joint with appressed rough beneath, terminal joint about half second, Maxillary palpi very short. Thorax smooth. t, sides clothed with projecting hairs. Anterior e more or less thickened with scales, middle tibiæ ove, posterior tibiæ densely rough-haired above Forewings with vein 1 long-furcate towards base, n angle, 4 and 5 closely approximated at base, 7 7 to apex or costa, 11 from middle. Hindwings vate, towards base below median and towards ensely clothed with long hairs, 1 *b* shortly furcate and 4 from a point or short-stalked, 5 tolerably 7 from a point or short-stalked, 8 connected with owards base.

ight orange. 28. *mythica.*
white or fuscous 2.

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27. *setiotricha*.

" not " " " " " "

26. *unipunctana*.

26. *Mar. unipunctana*, Don.

(*Tortrix unipunctana*, Don., Ins. N. Holl.; *Maroga gigantella*, Walk. 827.)

Both sexes 39-74mm. Head in male ochreous-white, in female light ochreous. Palpi dark fuscous, second joint more or less ochreous beneath. Antennæ dark fuscous. Thorax in male ochreous-white, in female light greyish-ochreous or fuscous. Abdomen dark fuscous, sides and margin of segment and anal tuft deep orange. Legs dark fuscous, middle and posterior tibiæ orange, posterior tarsi in male white. Forewings oblong, costa in male slightly, in female gently arched, apex obtuse, hindmargin rather obliquely rounded; in male shining snow-white, in female pale whitish-grey or light fuscous; a black dot in disc at $\frac{2}{3}$, variable in size, sometimes almost obsolete: cilia in male white, in female whitish or pale fuscous. Hindwings in male white, sometimes greyish-tinged on inner margin, in female fuscous, darker towards inner margin; cilia in male white, in female fuscous or whitish-fuscous, sometimes becoming white around apex.

Duaringa and Brisbane, Queensland; Newcastle and Sydney, New South Wales; Melbourne, Victoria; Mount Lofty, South Australia; Geraldton, West Australia; common, from October to December. Larva residing in a barricaded tunnel in stems of *Acacia decurrens*, *A. longifolia*, and other species of the genus, carrying in leaves or phyllodia for food, in September.

27. *Mar. setiotricha*, n. sp.

Both sexes 56-66mm. Head and thorax pale greyish-ochreous. Palpi dark fuscous. Antennæ grey. Abdomen dark purplish-fuscous, sides and anal tuft orange. Legs dark fuscous, middle and posterior tibiæ orange, posterior tarsi suffused with white towards apex of joints. Forewings elongate-oblong, costa almost straight, apex obtuse, hindmargin nearly straight, somewhat oblique, rounded beneath; grey-whitish, strewn with numerous long fine linear blackish scales; a blackish dot in disc at $\frac{3}{5}$: cilia white, base with a few fuscous and dark fuscous scales. Hindwings in male iridescent whitish, in female fuscous, darker towards base, apex paler; cilia white, in female more or less infuscated towards base.

Duaringa, Queensland; two specimens received from Mr. G. Barnard.

28. *Mar. mythica*, n. sp.

Both sexes 36-41mm. Head and thorax shining pale greyish-ochreous. Palpi dark red-brown, terminal joint whitish. Antennæ whitish, base dark reddish-fuscous. Abdomen ochreous-orange. Anterior legs dark fuscous, middle legs dark red-brown, tarsi dark fuscous, posterior legs ochreous-orange, tarsi pale ochreous. Forewings elongate, moderate, costa slightly arched, rather abruptly excavated from $\frac{2}{3}$ to near apex, apex acute, hindmargin little oblique, rather deeply excavated on upper half, rounded beneath; surface somewhat wrinkled transversely, pale ochreous, towards inner and hind margin somewhat brownish-tinged; costa and inner margin narrowly suffused with yellowish-brown; a round black dot in disc at $\frac{2}{3}$: cilia whitish-ochreous, terminal half red-brown towards apex. Hindwings light ochreous-orange; cilia pale yellowish, rosy-tinged, terminal half becoming brown-red round apex.

Sydney, New South Wales; three specimens in December. These were all taken on the stem of an old pear-tree in a garden, but I observed no indications of the larva.

5. Compsotorna, n. g.

Head with appressed hairs; ocelli absent; tongue short. Antennæ moderate, in male filiform, moderately ciliated (1), basal joint moderate, without pecten. Labial palpi long, recurved, second joint with appressed scales, terminal joint about half second, smooth, acute. Maxillary palpi very short. Thorax smooth. Abdomen moderate. Anterior tibiæ and tarsi much dilated with dense rough scales, posterior tibiæ rough-haired above and beneath. Forewings with vein 1 long-fuscate towards base, 2 from $\frac{1}{5}$, 3 from angle, 7 and 8 stalked from a point with 9, 7 to apex, 11 from middle. Hindwings 1, oblong-ovate, towards base below median and towards inner margin clothed with long hairs, 1*b* very shortly furcate at base, 3 and 4 from a point, 5 parallel, 6 and 7 from a point, 8 connected with cell at a point near base.

29. *Comps. oligarchica*, n. sp.

Male 22mm. Head and thorax ochreous-whitish, sides of face ochreous. Palpi whitish, second joint externally fuscous. Antennæ fuscous. Abdomen ochreous-whitish, posterior half of second segment dull red. Legs whitish, anterior pair whitish-ochreous. Forewings elongate, moderate, costa moderately arched, apex rounded, hindmargin not oblique, rounded beneath; whitish ochreous, with a few fine scattered black scales; a fuscous-grey straight longitudinal streak above middle from base to near apex, margined beneath first with blackish and then with an ochreous suffusion, and above and posteriorly by a white suffusion

reaching almost to costa; a triangular reddish-brown spot in disc at $\frac{2}{3}$, with a central transverse pale mark, its upper side rounded and whitish-margined, intersecting the fuscous longitudinal streak, its two lower sides black-margined; cilia whitish-ochreous. Hindwings and cilia whitish-ochreous.

Toowoomba, Queensland; one specimen in December.

6. Catoryctis, n. g.

Head smooth; ocelli absent; tongue well-developed. Antennæ moderate, in male filiform or serrate, shortly ciliated ($\frac{1}{4}$—$\frac{1}{2}$), basal joint moderate, without pecten. Labial palpi very long, recurved, second joint with appressed scales, terminal joint as long as second, slender, smooth, acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen moderate. Posterior tibiæ with appressed scales. Forewings with vein 1 furcate towards base, 2 from $\frac{2}{3}$, 3 from angle, 7 and 8 stalked, 7 to apex, or rarely 7 absent (coincident with 8), 11 from middle. Hindwings over 1, trapezoidal-ovate, 1*b* clothed with long hairs towards base, shortly fuscate at base, 3 and 4 from a point or short-stalked, 5 parallel, 6 and 7 approximated at base, 8 connected with cell at a point near base.

The species of this genus are probably all attached to *Casuarina*, and have the longitudinally striped colouration necessary for concealment among the slender twigs of that tree.

1. Forewings with white median streak interrupted transversely. 2.
" " " not " 3.
2. Subcostal streak reaching to middle. 32. *subnexella.*
" " " much beyond middle. 31. *eugramma.*
3. Hindwings whitish-ochreous. 30. *subparallela.*
" grey. 33. *tricrena.*

30. *Cat. subparallela*, Walk.

(*Oecophora subparallela*, Walk., 690; *Oec. nexella*, *ib.*, 692; *Oec. fissulella*, *ib.*, 1032.)

Male 17-21mm. Head light shining ochreous, sides white. Palpi pale ochreous, terminal joint and apex of second whitish. Antennæ white, annulated with fuscous. Thorax white, anterior margin and a lateral stripe pale ochreous. Abdomen whitish-ochreous. Legs light ochreous, anterior pair fuscous. Forewings elongate, costa moderately arched, apex round-pointed, hindmargin faintly sinuate, oblique; 7 absent; brownish-ochreous, golden-tinged; a slender silvery-white attenuated streak immediately beneath costa from near base to beyond middle; a

beyond middle to costa before apex; a moder-
ght entire silvery-white longitudinal median
o apex; a similar narrower parallel streak from
to hind margin below middle: cilia greyish-
n costa, cut by ill-defined white bars on longi-
anal angle wholly white. Hindwings whitish-
le yellow-ochreous; cilia whitish-ochreous.
uth Wales; several specimens taken and bred,
February. Larva feeding between joined
suberosa, in October.

31. *Cat. eugramma*, n. sp.

mm. Head light shining ochreous, sides white.
tish. Antennæ white, annulated with fuscous.
ochreous, with a white stripe on each side of
ale ochreous. Legs ochreous-whitish, anterior
rewings elongate, costa strongly arched, apex
indmargin faintly sinuate, extremely oblique;
dark ochreous-brown; markings shining white;
immediately beneath costa from near base to
osteriorly by one or two longitudinal veins; a
anteriorly attenuated, from disc at $\frac{1}{3}$ to apex;
streak from base along submedian fold to
anal angle, but posterior fourth reduced to
llel lines; a slender somewhat irregular streak
near base to anal angle; a slender streak
at $\frac{1}{2}$, running near inner margin to beyond
ous-brown, mixed with whitish, with a white
t). Hindwings fuscous, paler towards base, in
broad hind marginal band, narrowed towards
raised brownish-ochreous scales; cilia fuscous-

alhaven, New South Wales; in September,
uary, four specimens.

32. *Cat. subnexella*, Walk.

xella, Walk., 691.)

mm. Head iridescent-whitish, back of crown
with second joint light fuscous mixed with
ish beneath, terminal joint fuscous with an
ateral line. Antennæ white, annulated with
rax fuscous, sometimes mixed with whitish on
lescent towards apex. Abdomen whitish-
whitish, anterior pair fuscous. Forewings
derately arched, apex round-pointed, hind mar-

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gin straight, oblique; 7 present; fuscous, more or less ochreous-tinged; a white attenuated streak immediately beneath costa from base to middle; all veins tending to be marked posteriorly with whitish streaks, but generally very indistinct; a moderate straight silvery-white longitudinal median streak from base to apex, interrupted by a very oblique line of ground-colour before middle, lower edge emitting one or two short very oblique teeth on veins posteriorly; sometimes a small darker spot on lower margin of this at $\frac{2}{3}$; a slender whitish longitudinal streak from inner margin at $\frac{1}{4}$ to beyond middle, often almost entirely obsolete: cilia fuscous, mixed with paler, with a white basal spot at apex. Hindwings fuscous or grey, becoming lighter and sometimes ochreous-tinged towards base; cilia whitish, with a light fuscous line.

Sydney, New South Wales; Melbourne, Victoria; Geraldton and Perth, West Australia; in November, seven specimens.

33. *Cat. tricrena*, n. sp.

Male 20-21mm. Head white. Palpi white, second joint light greyish-ochreous above towards base. Antennæ fuscous, dotted with whitish, base white. Thorax white, anterior margin, a lateral stripe, and a narrow stripe on each side of back light fuscous. Abdomen whitish. Legs whitish, anterior pair fuscous. Forewings elongate, costa moderately arched, apex tolerably pointed, hindmargin faintly sinuate, oblique; 7 present; fuscous; a white streak from base immediately beneath costa, reaching costa at $\frac{1}{4}$, and continued along it to $\frac{2}{3}$, finely attenuated; one or two short whitish lines between veins towards costa posteriorly; a moderate straight white longitudinal median streak from base to apex, posterior fourth cut by a longitudinal fuscous line; three short white longitudinal lines between veins towards hindmargin; an ill-defined narrow whitish straight longitudinal streak from base of inner margin direct to anal angle, posteriorly confluent with a fine whitish line along submedian fold: cilia whitish, mixed with fuscous (imperfect). Hindwings grey; cilia grey-whitish.

Victor Harbour, South Australia, in November; two specimens received from Mr. E. Guest.

7. PHTHONERODES, n. g.

Head smooth; ocelli absent; tongue well-developed. Antennæ moderate, in male filiform, simple, basal joint elongate, without pecten. Labial palpi extremely long, slender, recurved, second joint smooth, terminal joint longer than second, acute. Maxillary palpi very short. Thorax smooth. Abdomen moderate. Posterior tibiæ shortly rough-scaled above. Forewings with vein 1

furcate towards base, 2 from $\frac{3}{4}$, 3 from angle, 7 and 8 stalked, 7 to hindmargin, 11 from middle. Hindwings over 1, suboblong, apex produced and pointed, 1*b* and 1*c* densely haired towards base, 1*b* shortly furcate at base, 3 and 4 from a point or short-stalked, 5 parallel, 9 and 8 approximated at base, 8 connected with cell at a point before middle.

Appears to be a development of *Catoryctis*.

34. *Phthon. scotarcha*, n. sp.

Both sexes 13-21mm. Head and thorax dark fuscous, with a fine white streak above eyes. Palpi blackish, second joint with white longitudinal line on each side, terminal joint with a white a line in front. Antennæ white, annulated with blackish; abdomen grey, sides whitish-yellowish. Legs grey, irrorated with yellow-whitish, posterior tibiæ pale whitish-yellowish. Forewings elongate, costa strongly arched, apex round-pointed, hindmargin rather deeply sinuate, oblique; fuscous, densely irrorated with blackish-fuscous; a straight white dark-margined longitudinal line from base below middle, more or less nearly approaching hindmargin above anal angle, but suffused and indistinct posteriorly, interrupted by a small dark fuscous spot in middle: cilia dark fuscous, with partially indicated yellow-whitish bars. Hindwings light yellow; sometimes some fuscous scales at extreme apex; cilia whitish-fuscous, with a darker fuscous line near base.

Quorn and Wirrabara, South Australia, in October; taken plentifully on a fence beneath some *Eucalyptus*-trees during a gale.

8. Crypsicharis, n. g.

Head with appressed hairs; ocelli absent; tongue well-developed. Antennæ moderate, in male filiform, ciliated with fascicles (2), basal joint moderately elongate, without pecten. Labial palpi very long, recurved, second joint with appressed scales, terminal joint shorter than second, slender, acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen moderate. Posterior tibiæ rough-haired above. Forewings with vein 1 furcate towards base, 2 from $\frac{4}{5}$, 3 from angle, 7 and 8 stalked, 7 to hind margin, 11 from middle. Hindwings 1, trapezoidal, apex round-pointed, costa in male with long pencil of hairs from base lying beneath inner margin of forewings, towards base below median and towards inner margin clothed with long hairs, 3 and 4 from a point, 5 parallel, 6 and 7 approximated towards base but widely separate, 8 connected with cell at a point before middle.

Doubtless an offshoot of *Lichenaula*.

35. *Cryps. neocosma*, n. sp.

Male 18-19mm. Head, palpi, antennæ, and thorax whitish-ochreous, slightly brownish-tinged. Abdomen whitish. Legs

brownish-ochreous, posterior pair whitish. Forewings elongate, costa gently arched, apex round-pointed, hind margin sinuate, oblique; whitish-ochreous, becoming whitish towards costa, pale brownish towards inner margin, posteriorly with a few scattered brown scales; a fuscous or dark fuscous dot on submedian fold before middle, and a second in disc at $\frac{2}{3}$; a triangular inwardly oblique cloudy fuscous or dark fuscous spot on inner margin immediately before anal angle: cilia whitish-ochreous, terminal half pale fuscous, on anal angle wholly light fuscous. Hindwings whitish, apex more or less tinged with grey; cilia whitish.

Brisbane, Queensland; two specimens in September.

9. Lichenaula, n. g.

Head smooth; ocelli absent; tongue well-developed. Antennæ moderate, in male serrulate, ciliated ($\frac{1}{4}$—2), basal joint moderate, without pecten. Labial palpi very long, recurved, second joint with appressed scales, terminal joint somewhat shorter than second, slender, acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen moderate. Posterior tibiæ rough-haired above and beneath. Forewings with vein 1 furcate towards base, 2 from $\frac{3}{4}$, 3 from angle, 7 and 8 stalked, 7 to hind margin or apex, 11 from middle. Hindwings over 1, trapezoidal-ovate, towards base below median and towards inner margin clothed with long hairs, 1*b* shortly furcate at base, 3 and 4 from a point or short-stalked, 5 parallel, 6 and 7 closely approximated at base, 8 connected with cell at a point before middle.

1. Forewings red-brown in disc. 36. *undulatella.*
   " not " 2.
2. Crown of head blackish. 38. *arisema.*
   " not " 3.
3. Thorax with a black anterior bar. 4.
   " without " 5.
4. Forewings with black bar from costa beyond middle to fold before middle. 39. *calligrapha.*
   Forewings without such bar. 40. *lichenea.*
5. Forewings with anterior half of costa broadly white. 37. *laniata.*
   " " " not white. 6.
6. Head clear white. 7.
   " more or less grey. 8.
7. Forewings oblong, hind margin rather oblique. 45. *mochlias.*
   " elongate, " very oblique. 42. *choriodes.*
8. Forewings with an ochreous suffusion in disc at $\frac{3}{4}$. 43. *tuberculata.*
   " without " " 9.

44. *musica.*

her narrow, " very oblique.

41. *lithina.*

36. *Lich. undulatella*, Walk.

ndulatella, Walk., 756.)

. Head, palpi, antennæ, and thorax grey; anten- Abdomen brownish. Anterior legs dark fuscous; erior pair white, tarsi fuscous, posterior tibiæ y. Forewings elongate, moderate, costa gently nded, hindmargin straight, oblique; 7 to hind- wn, becoming deeper on lower half; a rather eak along costa from near base to near apex, th extremities; a broad grey streak, sprinkled along inner margin from base to anal angle, forming a broad triangular projection upwards, oss wing, thence abruptly attenuated; a darker in disc at $\frac{2}{3}$; a slender strongly outwards-curved costal streak at $\frac{2}{3}$ to inner margin before anal above lower extremity, where it forms a small ical blotch, covering whole area beyond this line vards anal angle; a series of small dark fuscous lmargin and around apex: cilia light ochreous- a white basal line. Hindwings fuscous, lighter eous-tinged anteriorly, hindmargin suffusedly low-whitish, with a grey line.

South Wales, in November and January; three va 16-legged, stout, cylindrical; dirty whitish, ; feeds in a stout gallery of silk and refuse along *decurrens*, in October.

37. *Lich. laniata*, n. sp.

-18mm. Head and thorax white. Palpi white, cond joint dark fuscous. Antennæ white, annu- s, ciliations in male 2. Abdomen whitish. Legs gs elongate, costa moderately arched, apex round- rgin faintly sinuate, oblique; 7 to hindmargin; irrorated with dark-brown; a very broad white t both ends, along costa from base to beyond argin slenderly white towards base; an irregular ng inner margin from $\frac{1}{4}$ to $\frac{3}{4}$, its upper anterior projection towards base along fold, almost con- l streak, its upper posterior angle forming a pro- reaching half across wing; a dark fuscous dot in e transverse line, acutely angulated outwards in f costa to inner margin before anal angle, angula-

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tion confluent with a suffused white spot on hindmargin, and sometimes also filled up anteriorly with a white suffusion; a white hindmarginal line: cilia white, at anal angle fuscous, at apex somewhat mixed with fuscous. Hindwings and cilia whitish-grey.

Sydney, New South Wales, in December and January; three specimens.

38. *Lich arisema*, n. sp.

Both sexes 13-16mm. Head white, crown blackish-fuscous. Palpi white, base dark fuscous. Antennæ white, annulated with dark fuscous, ciliations in male $\frac{1}{2}$. Thorax white, sometimes yellowish-tinged, posterior extremity dark fuscous. Abdomen dark-grey, sides and apex whitish-yellowish. Legs whitish, anterior and middle pair banded with dark fuscous. Forewings elongate, costa gently arched, apex tolerably rounded, hindmargin obliquely rounded; 7 to hindmargin; whitish-ochreous or white; three moderately broad nearly straight blackish-fuscous fasciæ; first almost basal; second slightly curved, from middle of costa to beyond middle of inner margin, posterior edge sometimes with a short central projection; third hindmarginal, extending from apex almost to anal angle, narrowed to a point beneath, anterior edge sometimes angulated so as almost to touch preceding fascia in middle: cilia whitish-yellowish, with a dark fuscous line, sometimes somewhat mixed with dark fuscous except on anal angle. Hindwings, dark-grey; cilia whitish-yellowish, sometimes with a grey line.

Sydney, New South Wales; Mount Lofty, South Australia; three specimens in November and December.

39. *Lich. calligrapha*, n. sp.

Both sexes, 16-17mm. Head white. Palpi white, base of second joint, and base and apex of terminal joint black. Antennæ white, annulated with blackish, ciliations in male 1. Thorax white, anteriorly margin narrowly black, with a projection backwards on each side of back. Abdomen whitish. Legs white, anterior and middle pair banded with blackish. Forewings elongate, costa gently arched, apex round-pointed, hindmargin nearly straight, oblique; 7 to apex; ochreous-white; markings black; a spot on base of costa, and another on inner margin near base; an irregular-edged streak from costa beyond middle to submedian fold before middle, its lower extremity almost confluent with a small spot in disc at $\frac{1}{3}$; an erect mark from inner margin before anal angle, its apex acutely furcate; two small marks on costa towards apex, and some scattered black scales forming an apical suffusion: cilia ochreous-white, more or less distinctly barred with grey, with an interrupted blackish line. Hindwings whitish-

grey, more whitish anteriorly, apex grey; cilia grey-whitish, with traces of a darker line.

Sydney, New South Wales; Launceston, Tasmania; in November and January, three specimens.

40. *Lich. lichenea*, n. sp.

Both sexes 15-21mm. Head white. Palpi white, base of second joint, and base and apex of terminal joint blackish. Antennæ white, annulated with blackish, ciliations in male 1. Thorax white, sprinkled with black, and with a black transverse anterior spot on back. Abdomen grey or grey-whitish. Legs white, anterior and middle pair banded with blackish. Forewings elongate, costa gently arched, apex rounded, hind margin very obliquely rounded; 7 to apex or near below it; ochreous-white, with some scattered black scales; markings brown or grey, densely irrorated with black; a slender irregular oblique fascia near base, generally more or less broadly dilated on lower half; a moderate irregular spot on middle of inner margin; a dot in disc at $\frac{1}{3}$; a small spot in middle of disc, and a furcate mark on inner margin before anal angle, both often much enlarged and suffused so as to become confluent into a cloudy irregular fascia, connecting above with a small spot on costa beyond middle, whence proceeds an irregular somewhat outwards-curved transverse line, sometimes interrupted in disc, to rejoin ante-anal spot of inner margin; often a separate dot within enclosed space; two marks on costa towards apex; a suffused more or less developed subapical spot; a slender streak along hindmargin; all these markings very variable in size and suffusion: cilia ochreous-white, barred with grey, bars densely irrorated with black on basal half. Hindwings varying from rather dark grey to pale whitish-grey; cilia whitish, with a grey line.

Sydney, Bathurst (2,500 feet), and Cooma (3,000 feet), New South Wales; Melbourne, Victoria; common from November to April, at rest on fences and rocks. Larva 16-legged, moderate, cylindrical, with rather long scattered whitish hairs; grey; dorsal, subdorsal, lateral, and spiracular lines dark grey, irregular: spots moderate, black; head blackish; second segment whitish-grey, with a blackish divided plate; anal segment blackish: feeds on lichen-dust on fences and rocks, forming a tunnel in a crevice for shelter, and feeding beneath a gallery of web and refuse, in August and September. The species is a very variable one, and the varieties show some tendency to be localised.

41. *Lich. lithina*, n. sp.

Male 14mm. Head, palpi, and thorax white, sprinkled with fuscous. Antennæ white, annulated with fuscous, ciliations 1.

Abdomen whitish. Legs white, anterior pair dark fuscous. Forewings elongate, rather narrow, costa gently arched, apex round-pointed, hindmargin very obliquely rounded; 7 to apex; white, thinly and irregularly irrorated with black; a pale fuscous suffusion, forming a very indistinct blotch on anterior half of inner margin, a spot on inner margin before anal angle, a spot on costa beyond middle and another at $\frac{4}{5}$, all very faint and obscure: cilia white, irrorated with fuscous, appearing to form obscure darker bars, with an irregular row of black points. Hindwings whitish, with a bluish tinge, veins and hindmargin obscurely grey; cilia whitish, with faint traces of two grey lines.

Blackheath (3,500 feet), New South Wales; one specimen in January.

42. *Lich. choriodes*, n. sp.

Both sexes 14-22mm. Head and antennæ white, ciliations in male almost 2. Palpi white, second joint dark fuscous towards base. Thorax white, with some dark fuscous scales, and a small posterior dark fuscous spot. Abdomen whitish. Legs white, anterior pair dark fuscous, middle pair spotted with dark fuscous. Forewings elongate, costa gently arched, apex round-pointed, hind margin very obliquely rounded; 7 to apex or near below it; white, more or less densely irrorated with fuscous, and generally partially with black; markings ill-defined, formed by confluence of this irroration; a narrow transverse streak near base, not reaching costa; a triangular blotch on inner margin before middle, apex generally more blackish, reaching more than half across wing, ground colour above this blotch generally clear-white without irroration; a cloudy spot on costa beyond middle and another at anal angle, nearly confluent; two dark fuscous transversely placed sometimes confluent dots in disc at $\frac{2}{3}$; a more or less indicated pale angulated subterminal line, preceded and followed by darker suffusion: cilia whitish, with two cloudy fuscous lines, on costa indistinctly barred. Hindwings light fuscous, more whitish-fuscous towards base; cilia whitish, with a cloudy fuscous line.

Rosewood, Queensland; Sydney, New South Wales; Melbourne, Victoria; in December and February, rather common on fences. Larva feeding on lichen-dust on fences, beneath a gallery of web and refuse, forming a tunnel in a crevice for shelter, in September. This species is also a very variable one.

43. *Lich. tuberculata*, n. sp.

Both sexes 19-27mm. Head grey-whitish or grey. Palpi white, irrorated with dark fuscous. Antennæ grey, sprinkled with white, ciliations in male $\frac{1}{4}$. Thorax grey, sometimes mixed with blackish. Abdomen fuscous-whitish. Legs white, more or less

densely irrorated with dark fuscous. Forewings elongate, costa moderately arched, apex rounded, hindmargin very obliquely rounded; 7 to apex; ashy-grey, with scattered whitish scales; veins partially marked with slender blackish lines, most distinctly in disc and towards hindmargin, elsewhere hardly perceptibly; the white scales tend to form streaks in disc along these lines, and sometimes one or two small indistinct spots before middle of disc; two black dots transversely placed in disc at $\frac{2}{3}$, lower rather anterior, connected by a white posteriorly blackish-margined mark, followed by a cloudy roundish brownish-ochreous suffusion; some blackish scales forming an indistinct subapical suffusion: cilia whitish, with fuscous bars irrorated with black. Hindwings fuscous, more whitish-fuscous and ochreous-tinged anteriorly, hindmargin darker; cilia fuscous-whitish, with a fuscous basal line.

Sydney, New South Wales; in October and November, three specimens. Larva 16-legged, rather stout, cylindrical, with scattered hairs; whitish-grey; sides somewhat marbled with dull obscure purplish; spots moderate, raised, black; head rough, black; second segment reddish-brown, paler posteriorly, with a suffused black transverse band. Feeds on *Crowea saligna*, residing in a barricaded tunnel in fork of stem, and drawing up leaves for food, in September.

44. *Lich. musica*, n. sp.

Both sexes 17-20mm. Head greyish-ochreous mixed with white. Palpi white, more or less irrorated with greyish-ochreous. Antennæ whitish, obscurely annulated with grey, ciliations in male $1\frac{1}{2}$. Thorax greyish-ochreous, mixed with white and sprinkled with black. Abdomen grey-whitish. Legs whitish, anterior and middle pair suffusedly banded with dark fuscous. Forewings elongate, moderate, costa moderately arched, apex obtuse, hindmargin rather oblique, nearly straight, rounded beneath; 7 to hindmargin; greyish-ochreous, irrorated with white; some scattered black scales, tending to form more or less distinct streaks on veins, especially near hindmargin beneath apex, where in male they form a conspicuous triangular patch; a short indistinct outwardly oblique darker streak from inner margin at $\frac{1}{4}$; obscure indications of a cloudy somewhat darker fascia from middle of costa to inner margin before anal angle; two black dots transversely placed in disc at $\frac{2}{3}$, followed by a small obscure white suffusion; cilia whitish, mixed with ochreous, and barred with blackish irroration. Hindwings fuscous, paler towards base; cilia fuscous-whitish, with a fuscous line.

Port Lincoln, South Australia; Geraldton and Perth, West Australia; in November, three specimens.

45. *Lich. mochlias*, n. sp.

Female 26mm. Head white. Palpi white, terminal joint and upper half of second irrorated with dark fuscous. Antennæ whitish. Thorax whitish, irrorated with dark fuscous. Abdomen ochreous-whitish. Legs white, anterior and middle pair irrorated with dark fuscous, tarsi wholly blackish, posterior tarsi irrorated with fuscous. Forewings elongate-oblong, costa moderately arched, apex obtuse, hindmargin straight, rather oblique, rounded beneath; 7 to below apex; light grey, closely irrorated with dark fuscous; a slender transverse blackish streak near base, not reaching either margin; two obscure dark fuscous dots transversely placed in disc at $\frac{1}{3}$; a short blackish transverse mark in disc at $\frac{2}{3}$; indistinct traces of an angulated darker transverse line beyond this; four small dark fuscous spots on posterior half of costa: cilia whitish-grey, with two blackish-grey lines, first becoming interrupted into spots towards anal angle. Hindwings fuscous-grey, lighter towards base, apex darker; cilia whitish-fuscous, with two faint darker lines.

Melbourne, Victoria; one specimen received from Mr. G. H. Raynor.

10. NOTOSARA, n. g.

Head with appressed hairs; ocelli absent; tongue well-developed. Antennæ moderate, in male —?, basal joint moderate, without pecten. Labial palpi very long, recurved, second joint dilated with dense scales roughly projecting beneath, terminal joint as long as second, slender, acute. Maxillary palpi very short, appressed to tongue. Thorax with strong posterior crest. Abdomen moderate. Posterior tibiæ rough-haired above and beneath. Forewings with vein 1 very long-furcate towards base, 2 from angle, 7 and 8 stalked, 7 to apex, 11 from middle. Hindwings 1¼, ovate; 1*b* and 1*c* densely haired towards base, 1*b* shortly furcate at base, 3 and 4 short-stalked, 5 parallel, 6 and 7 approximated towards base, 8 connected with cell at a point before middle.

A development of *Lichenaula*.

46. *Not. nephelotis*, n. sp.

Female 24-28mm. Head, palpi, and thorax whitish, irrorated with dark fuscous, thoracic crest and apex of patagia dark fuscous. Antennæ grey, sprinkled with whitish. Abdomen fuscous-whitish. Legs white, irrorated with dark fuscous, middle and posterior femora clear white, posterior tibiæ ochreous-white. Forewings elongate-oblong, costa moderately arched, apex rounded, hindmargin obliquely rounded; brownish-grey, sprinkled with whitish; veins marked with partially interrupted fine black lines; an indistinct cloudy whitish suffusion forming an undefined

Both sexes 15-18 mm. Head and thorax white, densely irrorated with ochreous-grey. Palpi white, second joint dark ochreous-grey, except at base and apex; terminal joint grey on anterior edge. Antennæ whitish. Abdomen grey-whitish. Legs grey, posterior pair whitish. Forewings elongate, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded; white, irrorated with dark ochreous-grey, dorsal half suffused with pale grey; four small roundish cloudy rather dark grey spots, first three arranged in a longitudinal row in disc at $\frac{1}{3}$, $\frac{1}{2}$, and $\frac{2}{3}$, fourth directly beneath third; cilia whitish, base sprinkled with dark grey. Hindwings pale whitish-grey; cilia ochreous-whitish.

Mount Lofty, South Australia; Geraldton and Perth, West Australia, from October to January, and in April; six specimens. Larva feeding in seed-cones of *Banksia marginata*, forming a mat of the soft down, which is spread along the branch, several larvæ living together. For this information I am indebted to Mr. E. Guest, who has bred the species.

49. *Cler. dryinopa*, n. sp.

Female 24 mm. Head, palpi, antennæ, thorax, and abdomen ochreous-white, partially tinged with brownish-ochreous; abdominal segments with obscure narrow median transverse reddish bars. Legs whitish, suffused with light ochreous. Forewings elongate, costa moderately arched, apex obtuse, hindmargin nearly straight, rather oblique; white, irregularly irrorated with light ochreous; markings light brownish-ochreous, irregularly irrorated with dark fuscous; a moderate cloudy streak from base beneath costa to apex; a rather broad streak along inner margin from near base to anal angle, confluent with a small spot on submedian fold before middle; an irregular cloudy transverse streak from before $\frac{2}{3}$ of costa to anal angle; a broader cloudy transverse streak, angulated outwards above middle, from $\frac{3}{4}$ of costa to anal angle, where it coalesces with preceding; a cloudy streak round apex and along hindmargin: cilia pale ochreous, irrorated with fuscous, and indistinctly barred with whitish. Hindwings fuscous-whitish, terminal third suffused with fuscous, darker posteriorly; cilia fuscous-whitish, on upper half of hindmargin indistinctly barred with fuscous.

Melbourne, Victoria; one specimen received from Mr. G. H. Raynor.

12. Plectophila, n. g.

Head loosely haired; ocelli absent; tongue developed. Antennæ moderate, in male serrate, shortly ciliated ($\frac{1}{4}$-$\frac{1}{2}$), basal joint moderate, without pecten. Labial palpi long, recurved,

second joint with appressed scales, slightly roughened beneath, terminal joint shorter than second, with appressed scales, acute. Maxillary palpi very short. Thorax smooth. Abdomen moderate. Posterior tibiæ rough-haired above and beneath. Forewings with vein 1 furcate towards base, 2 from $\frac{2}{3}$, 3 from angle, 7 and 8 stalked, 7 to apex, 11 from middle. Hindwings 1, oblong-ovate; base below median and inner margin clothed with long hairs, 1*b* shortly furcate at base, 3 and 4 from a point, 5 tolerably parallel, 6 and 7 from a point, 8 connected with cell at a point towards base.

Forewings with an ochreous-brown fascia near base. 50. *electella.*
" without " " " " 51. *discalis.*

50. *Plect. electella*, Walk.

(*Oecophora electella*, Walk., 679.)

Both sexes 15-16 mm. Head white. Palpi white, second joint dark ochreous-brown towards base. Antennæ fuscous. Thorax white, with a horseshoe-shaped bright ochreous mark on middle of back. Abdomen whitish-ochreous. Legs ochreous-yellowish, anterior pair white above, dark fuscous beneath, hairs of posterior tibiæ ochreous-whitish. Forewings suboblong, costa moderately arched, apex roundpointed, hindmargin nearly straight, oblique; silvery-white; markings bright deep ochreous-brown, partially margined with light ochreous-yellowish scales; a straight narrow fascia from base of costa to $\frac{1}{4}$ of inner margin; a streak from upper extremity of this beneath costa, bent up to costa before middle, and continued along costa to $\frac{1}{2}$; a moderate irregular fascia from this streak before it reaches costa to inner margin at $\frac{3}{5}$, where it runs into a thick streak, attenuated at extremities, along inner margin from before middle to anal angle; a moderate fascia from costa at $\frac{3}{5}$ towards anal angle but not quite reaching it, connected with preceding fascia by a slender line in middle; a subapical spot, including a white dot on hindmargin, sometimes connected beneath with lower extremity of preceding fascia: cilia white, with dark grey bars at apex, middle, and anal angle, and basal half dark grey on lower half of hindmargin, with a cloudy black median line on dark grey portions. Hindwings grey, slightly ochreous-tinged; cilia whitish-grey-ochreous, with a cloudy grey basal line.

Sydney, New South Wales, from December to March; six specimens.

51. *Plect. discalis*, Walk.

(*Acontia discalis*, Walk. Suppl. 786.)

Both sexes 20-25 mm. Head, palpi, antennæ, thorax, abdomen, and legs white; anterior and middle legs infuscated. Forewings elongate-oblong, costa moderately arched, apex obtuse,

hindmargin sinuate, little oblique, rounded beneath; white; in female a light fuscous suffusion forming a cloudy fascia, its outer edge distinct and rectangularly angulated in middle, from $\frac{3}{5}$ of costa to inner margin before anal angle, and occupying entire dorsal $\frac{2}{3}$ of wing from base up to this, except a cloudy white spot below middle, sometimes irrorated with dark fuscous longitudinally in disc, and on posterior margin of fascia; in male these markings are largely reduced or nearly obsolete, showing only partial indications of the posterior fascia and a small spot on fold before middle; an irregular suffused fuscous streak along hindmargin, hindmarginal edge dark fuscous: cilia white, with two cloudy fuscous lines. Hindwings pale whitish-ochreous-grey, terminal half suffused with rather dark grey, extreme apex whitish-ochreous; cilia ochreous-whitish.

Sydney, New South Wales; in December and March, five specimens.

13. Tymbophora, n. g.

Head with appressed hairs; ocelli absent; tongue well-developed. Antennæ moderate, in male filiform, minutely ciliated ($\frac{1}{4}$), basal joint moderate, without pecten. Labial palpi very long, recurved, second joint with appressed scales, terminal joint almost as long as second, slender, acute. Maxillary palpi very short, appressed to tongue. Thorax with small posterior crest. Abdomen moderate. Posterior tibiæ rough-haired above and beneath. Forewings with vein 1 furcate towards base, 2 from $\frac{2}{3}$, 3 from angle, 7 and 8 stalked, 7 to hindmargin, 11 from middle. Hindwings over 1, trapezoidal-ovate; towards inner margin and base of 1*b* clothed with long hairs, 1*b* shortly furcate at base, 3 and 4 short-stalked, 5 tolerably parallel, 6 and 7 from a point, 8 connected with cell at a point before middle.

This is a simple development of *Telecrates*, differing from it essentially only by the crested thorax.

52. *Tymb. peltastis*, n. sp.

Both sexes 19-27mm. Head ochreous-whitish. Palpi whitish, second joint ochreous-brownish, except at apex and towards base beneath. Antennæ whitish fuscous. Thorax very pale whitish-ochreous, more or less fuscous-tinged posteriorly, crest pale reddish-fuscous in front. Abdomen fuscous-whitish, segments with obscure narrow median transverse reddish bars. Legs ochreous-fuscous, femora white, posterior tibiæ whitish-ochreous. Forewings elongate, moderate, costa moderately arched, apex obtuse, hindmargin sinuate, hardly oblique; very pale whitish-ochreous, with fine scattered black or brownish scales, more or less tinged or suffused with pale fuscous except towards anterior half of costa, sometimes very faintly; a trapezoidal deep brown-red blotch,

irrorated with black and a few ochreous-whitish scales, extending on inner margin from $\frac{1}{3}$ to $\frac{3}{4}$, narrowed upwards, upper side flat, not reaching half across wing; three or four brownish dots on posterior half of costa: cilia whitish-ochreous, on costa barred with brown-red, on hindmargin with terminal half barred with brown-reddish, at anal angle with a brown-red basal spot irrorated with black. Hindwings fuscous-grey, more or less suffused with pale whitish-ochreous anteriorly; cilia ochreous whitish, with two cloudy pale fuscous lines.

Brisbane, Queensland; Sydney and Cooma (3,000 feet), New South Wales; Adelaide, South Australia; Fremantle, West Australia; in December and January, not uncommon. Larva 16-legged, stout, cylindrical, with scattered pale hairs; pale greyish-ochreous; spots moderate, dark fuscous; subdorsal strong, fuscous; sides irregularly marked with light pinkish; head irregularly spotted with dark ochreous-brown; second segment grey-whitish, with a suffused ochreous-brown transverse median band spotted with dark fuscous; anal segment speckled with black: feeds on *Angophora lanceolata*, residing in a chamber of silk beneath the bark, in October.

14. Xylorycta, n. g.

Head with loosely appressed hairs; ocelli absent; tongue well developed. Antennæ moderate, in male filiform or subserrate, strongly ciliated ($1\frac{1}{2}$-2), basal joint moderate, without pecten. Labial palpi long, recurved, second joint with appressed scales, terminal joint nearly as long as second, smooth, acute. Maxillary palpi very short. Thorax smooth. Abdomen moderate. Posterior tibiæ rough-haired above and beneath. Forewings with vein 1 long-furcate towards base, 2 from $\frac{2}{3}$-$\frac{3}{4}$, 3 from angle, 7 and 8 stalked, 7 to hindmargin, 11 from middle. Hindwings over 1, oblong-ovate, towards base below median and towards inner margin densely clothed with long hairs, 1*b* shortly furcate at base, 3 and 4 from a point or short-stalked, 5 tolerably parallel, 6 and 7 from a point or short-stalked, 8 connected with cell at a point towards base.

This genus and the following are closely related, differing essentially only by the antennal ciliations; they are distinct enough at present, but might hereafter be united by the discovery of connecting forms. I think *Xylorycta* may be regarded as the immediate parent of *Cryptophaga*, which is distinguished from it mainly by the pectinated antennæ. The larval habits are similar.

In this and the three following genera great care must be taken not to confuse together the various unicolorous white species, and the structural differences must be accurately observed;

similar appearance in the *Oecophoridæ* and *Gelechiadæ*, whi
might very easily be mixed with them, even by a skilled observe
The superficial resemblance of these various forms is very grea
but I am unable to determine whether they imitate one anoth
or a common model, or whether the very simple resultant ma
not have been produced independently by similar developme
under analogous circumstances, without direct imitation of an
thing; for instance, the end desired might have been conspicuou
ness.

1. Forewings with three ochreous-brown fasciæ. 53. *ophiogramm*
   " without fasciæ. 2.
2. Forewings with darker longitudinal discal streak. 3.
   " without " " " " 4.
3. Forewings with dorsal half wholly light fuscous. 55. *strigata.*
   " " " " not " " 54. *synaula.*
4. Forewings with tips of hindmarginal cilia orange. 59. *luteotactella.*
   " " " " white. 5.
5. Sides of face orange. 57. *cosmopis.*
   " " not orange. 6.
6. Sides of face fuscous. 58. *argentella.*
   " " ochreous-white 56. *orectis.*

53. *Xyl. ophiogramma*, n. sp.

Female 24-28 mm. Head orange. Palpi pale yellowish, second joint dark fuscous externally on lower $\frac{2}{3}$, terminal joint whitish, anterior edge fuscous. Antennæ ochreous-whitish. Thorax silvery-white, with a transverse ochreous-brown bar behind collar. Abdomen whitish-ochreous. Legs dark fuscous, middle pair banded with ochreous-whitish, posterior pair pale yellowish. Forewings elongate-oblong, costa slightly arched, apex obtuse, hindmargin straight, little oblique; silvery-white; markings dark ochreous-brown; a slender costal streak from base to $\frac{3}{4}$; three narrow irregular fasciæ, first very near base; second from beyond middle of costa to before middle of inner margin, slightly sinuate inwards on lower half; third from costa before apex to anal angle, rather angulated inwards in middle, lower extremity connected with middle of second fascia by an irregular bar: cilia whitish-ochreous, base more yellowish-ocherous. Hindwings whitish-ochreous, yellowish-tinged, towards apex suffused with light grey; cilia as in forewings.

Duaringa, Queensland; three specimens received from Mr. G. Barnard. Larva, according to Mr. Barnard, residing in a barri-

caded tunnel in stem of *Hakea lorea*, and carrying in the very long filiform leaves for food.

54. *Xyl. synaula*, n. sp.

Both sexes 26-30 mm. Head light ochreous-orange, face suffused with white. Palpi white, second joint suffused in male with blackish, in female with light ochreous-orange towards apex beneath, anterior edge of terminal joint dark fuscous. Antennæ grey. Thorax ochreous-brown, patagia except base, and a central stripe white. Abdomen whitish-ochreous. Legs rather dark fuscous, hairs of posterior tibiæ white. Forewings elongate, moderate, costa gently arched, apex roundpointed, hindmargin oblique, slightly rounded; silvery-white; costal edge very slenderly black towards base, yellowish-ochreous beyond middle; markings ochreous-brown; a moderate almost straight streak above middle from base to apex; a similar slightly sinuate streak from base to anal angle; a slender streak along inner margin from before middle to anal angle: cilia white, basal half at apex and towards anal angle ochreous-yellow. Hindwings light grey, more whitish-tinged towards base; cilia ochreous-white, in female with a grey line.

Ardrossan and Victor Harbor, South Australia; two specimens. Mr. E. Guest has bred this species from the larva, which feeds in long gallaries of silk and refuse among the twigs and thorns of a species of *Hakea*.

55. *Xyl. strigata*, Lw.

(*Cryptophasa strigata*, Lw., Ins. N.S. Wales.)

Both sexes 22-32 mm. Head and thorax light fuscous, patagia sometimes whitish towards base. Palpi and antennæ fuscous-whitish. Abdomen whitish, anal tuft whitish-ochreous. Legs whitish, anterior pair fuscous. Forewings elongate-oblong, costa gently arched, apex roundpointed, hindmargin nearly straight, oblique; white; dorsal half light fuscous; a moderate straight darker fuscous streak above middle from base to apex: cilia white, round anal angle light fuscous, sometimes with a light fuscous subapical line. Hindwings whitish-fuscous, more whitish towards base, more or less suffused with darker fuscous towards apex; cilia whitish.

Sydney, New South Wales; Melbourne, Victoria; in November and December, common. Larva 16-legged, stout, cylindrical, with scattered long whitish hairs; whitish, posteriorly suffused with pale pinkish-ochreous; segments 5-12, with a square of four transverse-elongate black spots on back, a large irregular black spot on side, enclosing a pale ocellus, a small black spot beneath this, and two others behind it, and an irregular square of four

large double-triangular spot on back, third with a much lar one, each with four or five irregular spots on sides; second s ment deep amber, each side with narrow black transverse strip head rugose, black; anal segment pale yellowish, shining. Fe on *Banksia serrata* and other species of the genus, and *Lambertia formosa*, residing in a barricaded tunnel in t branches, and carrying in leaves for food, in August and S tember.

56. *Xyl. orectis*, n. sp.

Male 34 mm. Head and thorax ochreous-white, crown m ochreous-tinged. Palpi, antennæ, and abdomen white. L light ochreous, posterior pair white. Forewings elongate, co slightly arched, apex obtuse, hindmargin slightly rounded, rath strongly oblique; snow-white; extreme costal edge ochreo tinged: cilia white. Hindwings pale grey, becoming white wards base; apex and upper part of hindmargin irregula white; cilia white.

Perth, West Australia; in November, one specimen.

57. *Xyl. cosmopis*, n. sp.

Both sexes 22-24 mm. Head white, sides of face orange. Pa white, second joint more or less orange-tinged. Antennæ whitis Thorax silvery-white. Abdomen white, anal tuft ochreo tinged. Legs ochreous-whitish, anterior and middle tibiæ mo or less suffused with light orange. Forewings elongate, moderat costa slightly arched, apex obtuse, hindmargin gently rounde oblique; shining snow-white; costa slenderly ochreous-tinge costal edge very slenderly blackish on basal fourth: cilia whit Hindwings grey-whitish, apex somewhat greyer; cilia white.

Geraldton, Perth, and Albany, West Australia; in Novembe four specimens.

58. *Xyl. argentella*, Walk.

(*Cryptolechia argentella*, Walk., 750.)

Both sexes 18-30 mm. Head pale yellowish-ochreous, sides face light fuscous. Palpi white, second joint fuscous except lower half beneath. Antennæ whitish. Thorax white, becomin whitish-ochreous anteriorly. Abdomen white, anal tuft ochreou tinged. Legs dark fuscous, apex of joints whitish, posterior pa whitish-ochreous. Forewings elongate, moderate, costa gentl arched, apex round-pointed, hindmargin straight, oblique shining white, faintly ochreous-tinged, more distinctly on costa edge; costal edge very slenderly black on basal fourth: cili ochreous-white. Hindwings light grey, becoming ochreou whitish towards inner margin; cilia ochreous-whitish.

Sydney, New South Wales; Melbourne, Victoria; Deloraine and Hobart, Tasmania; from October to March, rather common.

59. *Xyl. luteotactella*, Walk.

(*Cryptolechia luteotactella*, Walk. 750; *C. cognatella*, ib. 751.)

Both sexes 17-26 mm. Head white, sides of face broadly orange. Palpi orange, terminal joint white. Antennæ ochreous-whitish, base orange. Thorax and abdomen white, anal tuft ochreous-tinged. Legs orange, posterior tibiæ white. Forewings elongate, moderate, costa slightly arched, apex obtuse, hind-margin straight, rather oblique; shining snow-white; costal edge narrowly orange, sometimes slenderly blackish towards base: cilia white, terminal third orange from below apex to above anal angle. Hindwings grey-whitish, posteriorly suffused with light grey; cilia white.

Sydney and Blackheath (3,500 feet), New South Wales; Melbourne, Victoria: in November, December, February, and March, common, especially in the larval state. Larva 16-legged, stout, cylindrical with scattered long hairs; whitish-grey, with subdorsal, spiracular, and subspiracular rows of large circular black spots, two on each segment; second segment ochreous-brown, with similar spots; head chestnut-brown, shining, forehead black: feeds on *Lambertia formosa*, *Hakea acicularis*, *Persoonia lanceolata*, *Banksia latifolia*, and probably many of the *Proteaceæ*, making firm broad galleries of silk and refuse amongst twigs, sometimes with a tunnel for retirement in the seed-vessels or midrib of leaves when suitable, gnawing the bark and leaves, in September, October, and December.

15. TELECRATES, n. g.

Head with appressed hairs; ocelli absent; tongue well developed. Antennæ moderate, in male serrulate, very shortly ciliated ($\frac{1}{4}$-$\frac{1}{3}$), basal joint moderate, without pecten. Labial palpi very long, recurved, second joint smooth-scaled, terminal joint as long as second or nearly, or rarely only half as long, slender, acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen moderate. Posterior tibiæ rough-haired above and beneath. Forewings with vein 1 furcate towards base, 2 from $\frac{1}{3}$, 3 from angle, 7 and 8 stalked, 7 to hindmargin, 11 from middle. Hindwings over 1, trapezoidal, densely haired towards base below middle, 1*b* shortly furcate at base, 3 and 4 from a point or short-stalked, 5 tolerably parallel, 6 and 7 from a point or stalked, 8 connected with cell at a point towards base.

1. Forewings white. 2.
" not white. 6.
2. Forewings with dark streaks on all veins. 65. *calligramma*.
" without dark streaks. 3.

4. Forewings with two longitudinal yellow-ochreous stripes. 64. *parabolella.*
" without two longitudinal yellow-ochreous stripes. 5.

5. Terminal joint of palpi half second. 66. *micracma.*
" " " " as long as second. 63. *placidella.*

6. Forewings yellow. 61. *laetiorella.*
" fuscous. 60. *melanula.*

60. *Tel. melanula*, n. sp.

Both sexes 21-24mm. Head, antennæ, and thorax light ash fuscous, patagia dark fuscous. Palpi fuscous-whitish, irrorate with dark fuscous. Abdomen fuscous-whitish, segments wit sharply-marked rather broad dull red median transverse bar Legs whitish, irrorated with fuscous, anterior pair suffused wit dark fuscous. Forewings elongate, moderate, costa moderatel arched, apex obtuse, hindmargin straight, somewhat oblique fuscous, lighter anteriorly, posteriorly slightly reddish-tinged dorsal half suffused with ashy-grey, except an indistinct cloud spot towards fold beyond middle; extreme costal edge whitis from $\frac{2}{5}$ to $\frac{4}{5}$; a thick dark fuscous streak beneath submedian fol from base to $\frac{1}{3}$; a whitish dot in disc at $\frac{2}{3}$: cilia fuscous. Hinc wings with veins 6 and 7 from a point; fuscous-grey; cili fuscous-whitish, with two faint cloudy darker lines.

Sydney, New South Wales, in December; two specimens re ceived from Mr. G. H. Raynor.

61. *Tel. laetiorella*, Walk.

(*Oecophora laetiorella*, Walk. 677.)

Both sexes 16-23mm. Head black, face pale yellow. Palp whitish-yellowish, base of second joint and terminal joint excep base dark fuscous. Antennæ yellow-whitish, towards base dark fuscous. Thorax ochreous-yellow. Abdomen light ochreous yellowish, sprinkled with grey. Legs light ochreous-yellowish anterior and middle pair suffusedly banded with grey. Fore wings elongate-oblong, costa moderately arched, apex obtuse hindmargin faintly sinuate, oblique; ochreous-yellow; two very broad deep purple fasciæ, obscurely margined with dark fuscous first almost basal, outer edge slightly convex; second hindmar ginal, anterior edge rather strongly convex: cilia ochreous yellow, on costa purple-fuscous, at anal angle with a broad deep purple bar. Hindwings with veins 6 and 7 stalked; rather dark fuscous-grey; cilia pale ochreous-yellowish, above apex with a grey line near base.

Brisbane, Queensland; Newcastle and Sydney, New South Wales; Mount Lofty and Port Lincoln, South Australia; in September, October, January, and March, not uncommon. Larva residing in a barricaded tunnel in stems of *Eucalyptus*, carrying in leaves for food.

62. *Tel. bipunctella*, Walk.

(*Cryptolechia bipunctella*, Walk. 749.)

Male 24-25 mm. Head, thorax, and abdomen ochreous-white, sides of face fuscous. Palpi white, upper half of second joint dark fuscous. Antennæ whitish-fuscous. Legs dark fuscous, apex of joints whitish, posterior pair whitish. Forewings elongate-oblong, costa moderately arched, apex round-pointed, hindmargin faintly sinuate, oblique; ochreous-white, costa more ochreous-tinged; costal edge dark fuscous towards base; two moderate roundish dark-grey dots transversely placed in disc at $\frac{2}{3}$: cilia white. Hindwings with veins 6 and 7 from a point or short-stalked; ochreous-whitish, slightly greyish-tinged; cilia white.

Launceston, Tasmania; in December and January, three specimens.

63. *Tel. placidella*, Walk.

(*Cryptolechia placidella*, Walk. 750.)

Male 19-20 mm. Head white, sides of face broadly fuscous. Palpi white, upper half of second joint dark fuscous. Antennæ white, annulated with fuscous. Thorax white, anteriorly becoming whitish-ochreous. Abdomen ochreous-whitish. Legs ochreous-whitish, anterior and middle pair suffusedly banded with fuscous. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin slightly sinuate, oblique; shining white; costal edge whitish-ochreous, extreme edge dark fuscous towards base: cilia whitish-ochreous, towards anal angle more yellowish-tinged. Hindwings with veins 6 and 7 from a point; pale whitish-ochreous, posterior half, except margin, suffused with light grey; cilia whitish-ochreous.

Sydney, New South Wales; in November, three specimens.

64. *Tel. parabolella*, Walk.

(*Oecophora parabolella*, Walk. 690.)

Both sexes 25-29 mm. Head ochreous-grey, sides of crown and lower part of face white. Palpi white, second joint brownish-ochreous except at apex and towards base, terminal joint dark fuscous anteriorly. Antennæ light grey. Thorax greyish-ochreous, becoming deep yellow-ochreous anteriorly. Abdomen whitish-ochreous. Legs ochreous-fuscous, posterior pair ochreous-whitish. Forewings elongate, moderate, costa moderately arched, apex obtuse, hindmargin straight, oblique; silvery-white; a

moderate deep yellow-ochreous longitudinal streak above middle from base to apex ; a broader similar stripe near inner margin from base throughout, touching inner margin at $\frac{1}{3}$, at extremity continued upwards more narrowly along hindmargin to meet upper streak at apex : cilia whitish-ochreous, basal half white except at anal angle. Hindwings grey, extreme apex whitish-ochreous ; cilia whitish-ochreous.

Blackheath (3,500 feet), New South Wales ; Hobart, Tasmania ; Mount Lofty, South Australia ; from October to December, eight specimens. Larva feeds in the seed-cones of *Banksia marginata*.

65. *Tel. calligramma*, n. sp.

Both sexes 22-23 mm. Head fuscous, lower part of face and a mark above eyes white. Palpi dark fuscous, suffused with white above, and towards base of second joint on sides. Antennæ fuscous. Thorax fuscous, with a slender white stripe on each side of back. Abdomen fuscous-whitish. Legs dark fuscous, posterior pair fuscous-whitish. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin nearly straight, oblique ; shining white ; all veins marked with rather thick bronzy-fuscous streaks : cilia fuscous-whitish, base bronzy-fuscous. Hindwings light grey, veins darker, apex suffused with whitish-ochreous ; cilia ochreous-whitish, with a faint fuscous basal line.

Blackheath (3,500 feet), New South Wales ; four specimens in November.

66. *Tel. micracma*, n. sp.

Male 17-18mm. Head white, with a suffused dark fuscous spot above each antenna. Palpi white, second joint irrorated with dark fuscous, towards apex wholly dark fuscous, terminal joint hardly half second. Antennæ dark grey. Thorax white, anteriorly ochreous-tinged. Abdomen grey-whitish. Legs dark grey, posterior pair grey-whitish. Forewings elongate, costa moderately arched, apex round pointed, hindmargin sinuate, oblique ; silvery-white ; costal edge finely dark fuscous towards base : cilia silvery-white, on costa light grey. Hindwings grey ; cilia white, base greyish-tinged.

Deloraine, Tasmania ; four specimens in December.

16. Chalarotona, n. g.

Head with appressed hairs ; ocelli absent ; tongue well-developed. Antennæ moderate, in male filiform, minutely ciliated ($\frac{1}{4}$-$\frac{1}{3}$), basal joint moderate, without pecten. Labial palpi very long, recurved, second joint smooth-scaled or slightly rough towards apex beneath, terminal joint from half to nearly as long as second, slender, acute. Maxillary palpi very short. Thorax

smooth. Abdomen moderate. Posterior tibiæ rough-haired above and beneath. Forewings with vein 1 furcate towards base, 2 from $\frac{3}{4}$, 3 from angle, 7 and 8 stalked, 7 to apex, 11 from middle. Hindwings over 1, oblong-ovate; 1*b* and 1*c* densely haired towards base, 1*b* shortly furcate at base, 3 and 4 from a point or short-stalked, 5 tolerably parallel, 6 and 7 stalked, 8 connected with cell at a point towards base.

1. Forewings whitish. 2.
" ochreous-yellowish. 3.
2. Forewings with a fuscous streak along inner margin. 71. *craspedota.*
" without a fuscous streak along inner margin. 70. *insincera.*
3. Hindwings ochreous-whitish. 69. *melitoleuca.*
" grey. 4.
4. Second joint of palpi externally wholly dark fuscous. 68. *melipnoa.*
" " " dark grey on upper half only. 67. *intabescens.*

67. *Chal. intabescens*, n. sp.

Both sexes 16-23mm. Head ochreous-yellowish, sides of face somewhat infuscated. Palpi ochreous-whitish, second joint dark grey on upper half except at apex, terminal joint in male $\frac{3}{4}$, in female nearly 1, dark grey anteriorly, in male towards apex only. Antennæ light grey, often ochreous-whitish towards base. Thorax ochreous-yellow, generally more or less suffused with grey anteriorly. Abdomen whitish-ochreous, apex more yellowish. Legs dark grey mixed with ochreous-yellowish, posterior pair whitish-ochreous. Forewings elongate, costa moderately arched, apex obtuse, hindmargin oblique, slightly rounded; clear ochreous-yellowish; generally a cloudy-grey or dark grey dot above anal angle, sometimes obsolete: cilia pale ochreous-yellowish. Hindwings grey, darker posteriorly; cilia whitish-ochreous, more yellowish towards base, rarely somewhat greyish-tinged.

Sydney and Blackheath (3,500 feet), New South Wales, in September and November, not uncommon; appears to frequent *Banksia*.

68. *Chal. melipnoa*, n. sp.

Both sexes 16-21mm. Head and thorax ochreous-yellowish, sides of face fuscous. Palpi ochreous-whitish, second joint externally wholly rather dark fuscous, terminal joint $\frac{2}{3}$-$\frac{3}{4}$, dark fuscous anteriorly. Antennæ grey. Abdomen whitish-ochreous. Legs fuscous, posterior pair pale whitish-ochreous. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin oblique,

slightly rounded; light yellowish-ochreous: cilia light yellowish-ochreous. Hindwings grey; cilia whitish-yellowish.

Blackheath (3,500 feet), New South Wales; Mount Lofty, South Australia; in October, six specimens. Closely allied to the preceding, but certainly distinct; probably also attached to *Banksia*.

69. *Chal. melitoleuca*, n. sp.

Both sexes 11-14 mm. Head and thorax ochreous-yellow. Palpi whitish, second joint with a grey subapical band, terminal joint $\frac{2}{3}$-$\frac{3}{4}$. Antennæ whitish. Abdomen ochreous-whitish. Legs ochreous-whitish, anterior pair suffused with grey. Forewings elongate, costa moderately arched, apex tolerably pointed, hindmargin slightly rounded, very oblique; rather deep ochreous-yellow: cilia ochreous-yellow, tips paler. Hindwings and cilia ochreous-whitish.

Sydney, New South Wales; two specimens in February.

70. *Chal. insincera*, n. sp.

Both sexes 16-21 mm. Head whitish-ochreous, sides of face dark fuscous. Palpi whitish, second joint rather dark fuscous except towards base, terminal joint in male $\frac{1}{2}$, in female $\frac{2}{3}$. Antennæ fuscous. Thorax whitish-ochreous, becoming white posteriorly. Abdomen ochreous-whitish. Legs dark grey, posterior pair ochreous-whitish. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin nearly straight, oblique; shining ochreous-white: cilia ochreous-white. Hindwings light grey, apex tinged with whitish-ochreous; cilia ochreous-whitish, base more ochreous-tinged.

Deloraine and Hobart, Tasmania; in November and December, four specimens.

71. *Chal. craspedota*, n. sp.

Both sexes 17-19 mm. Head white, sides of face dark fuscous. Palpi white, second joint dark fuscous except towards base, terminal joint $\frac{1}{2}$-$\frac{2}{3}$, anterior edge dark fuscous. Antennæ fuscous. Thorax pale whitish-ochreous. Abdomen ochreous-whitish. Legs dark fuscous, posterior pair whitish. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin slightly sinuate, very oblique; silvery-white, towards apex slightly fuscous-tinged; a narrow fuscous or rather dark fuscous streak along inner margin from near base to anal angle, upper edge suffused and ochreous-tinged: cilia ochreous-whitish. Hindwings ochreous-grey-whitish; towards apex more ochreous-tinged; cilia ochreous-whitish.

Blackheath (3,500 feet), New South Wales; Adelaide, South Australia; in March, four specimens.

17. Scieropepla, Meyr.

Head smooth; ocelli absent; tongue well developed. Antennæ moderate, in male serrate, moderately ciliated (½-1), basal joint moderate, without pecten. Labial palpi moderately long, recurved, second joint smooth-scaled, somewhat thickened terminally, terminal joint shorter than second (½ to nearly 1), acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen moderate. Posterior tibiæ densely roughhaired above. Forewings with vein 1 furcate towards base, 2 from ⅓, 7 and 8 stalked, 7 to costa, 11 from middle. Hindwings 1 or somewhat over, trapezoidal, apex roundpointed, 1*b* densely haired towards base, shortly furcate at base, 3 and 4 short-stalked, 5 tolerably parallel, 6 and 7 stalked, 8 connected with cell by bar before or beyond middle, cell sometimes bent up on bar.

1.	Forewings with apex very acutely produced.	80. *oxyptera.*
	" " " not " "	2.
2.	Forewings white.	3.
	" ochreous or grey.	4.
3.	Antennæ and sides of face fuscous.	72. *polyxesta.*
	" " " white.	73. *reversella.*
4.	Hindwings whitish-ochreous.	76. *typhicola.*
	" greyish.	5.
5.	Forewings with costa suffused with white.	6.
	" " " not " " "	8.
6.	Forewings with a dark fuscous dot in disc at ⅔.	77. *rimata.*
	" without " " " "	7.
7.	Antennæ dark grey.	75. *liophanes.*
	" whitish.	74. *acrates.*
8.	Forewings densely irrorated with white.	78. *silvicola.*
	" not " "	79. *serina.*

72. *Scier. polyxesta*, n. sp.

Both sexes 14-21 mm. Head white, sides of face dark fuscous. Palpi white, second joint dark fuscous except towards base, terminal joint ½. Antennæ fuscous. Thorax very pale whitish-ochreous. Abdomen ochreous-whitish. Legs dark fuscous, posterior pair ochreous-whitish. Forewings elongate, costa moderately arched, apex pointed, hindmargin very obliquely rounded; shining ochreous-white, apex and inner margin more ochreous-tinged: cilia ochreous-white. Hindwings rather light grey, apex somewhat ochreous-tinged; cilia pale whitish-ochreous.

Bathurst (2,500 feet) and Blackheath (3,500 feet), New South Wales; Deloraine and Launceston, Tasmania; in January and March, eight specimens.

73. *Scier. reversella*, Walk.

(*Cryptolechia reversella*, Walk. 752; *C. abrosella*, *ib.* 752.)

Both sexes 15-20 mm. Head, antennæ, thorax, and abdomen white. Palpi white, second joint with an ochreous subapical band irrorated with dark fuscous in front, terminal joint $\frac{2}{3}$. Legs whitish-ochreous, posterior pair white. Forewings elongate, costa gently arched, apex round-pointed, hindmargin extremely obliquely rounded; snow-white: cilia white. Hindwings whitish-grey, apex slightly ochreous-tinged; cilia white.

Sydney, New South Wales; Perth, West Australia; in October, November, January, February, June, and July, common.

74. *Scier. acrates*, n. sp.

Both sexes 14-17 mm. Head and thorax light ochreous-grey. Palpi white, second joint with upper half ochreous-grey except at apex, terminal joint $\frac{2}{3}$. Antennæ, abdomen, and legs whitish, anterior legs grey. Forewings elongate, costa gently arched, apex round-pointed, hindmargin faintly sinuate, very oblique; pale ochreous-greyish; costa suffused with whitish from base to $\frac{2}{3}$: cilia whitish. Hindwings light grey or whitish-grey, apical edge whitish-ochreous; cilia white, sometimes ochreous-tinged.

Blackheath (3,500 feet) and Mittagong (3,000 feet), New South Wales; Geraldton and Albany, West Australia; in October, March, and April, not uncommon. Larva feeds in the seed-cones of *Banksia collina*, burrowing among the seeds.

75. *Scier. liophanes*, n. sp.

Both sexes 14-15 mm. Head and thorax ochreous-grey, speckled with white. Palpi white, second joint with upper half dark grey except at apex, terminal joint $\frac{2}{3}$, anterior edge grey. Forewings elongate, costa gently arched, apex pointed, hindmargin extremely obliquely rounded; glossy ochreous-grey; costa narrowly suffused with white from base to $\frac{3}{4}$: cilia grey-whitish, base greyer. Hindwings light grey; cilia grey-whitish.

York, West Australia; in October, five specimens.

76. *Scier. typhicola*, Meyr.

(*Scieropepla typhicola*, Meyr., Trans. N.Z. Inst. 1885, 165.)

Both sexes 15-19 mm. Head and thorax light brownish-ochreous, face ochreous-whitish. Palpi ochreous-white, second joint fuscous except at apex and towards base, terminal joint $\frac{2}{3}$, anterior edge fuscous. Antennæ whitish-ochreous. Abdomen ochreous-whitish. Anterior legs dark brown, middle legs ochreous-brownish, posterior legs ochreous-whitish. Forewings elongate, costa gently arched, apex round-pointed, hindmargin extremely obliquely rounded; light ochreous, irrorated with dark

fuscous; costa suffused with pale whitish-ochreous from base to $\frac{3}{4}$: cilia pale whitish-ochreous. Hindwings whitish-ochreous, paler anteriorly; cilia pale whitish-ochreous.

Sydney, New South Wales; bred commonly from June to August; occurs also in New Zealand. Larva 16-legged, stout, cylindrical; whitish, sometimes pinkish-tinged; dorsal slender, dark flesh-colour; subdorsal and spiracular lines broader, indistinct, flesh-colour; head pale amber, mouth fuscous; second segment with a faint pale amber shield, black-margined on sides; anal segment speckled with black. Feeds in seed-heads of *Typha angustifolia*, burrowing amongst seeds and causing the down to hang in large loose masses, or sometimes boring down the stems, eating the pith and making many small holes in sides, in June. As this insect is quite isolated in New Zealand, whilst it is closely allied to the preceding and following species which are confined to Australia, it is safe to infer that it is truly an indigenous Australian insect, and has incidentally succeeded in making its way to New Zealand. I conjecture that the eggs, attached to the light down of the plant, would be very readily transmissible by the wind; and I have pointed out elsewhere that the wide distribution of *Limnœcia phragmitella*, a species of *Elachistidæ* which occurs in Australia, New Zealand, and Europe, and of which the larva feeds also on *Typha* in precisely the same way, is confirmatory of this suggestion.

77. *Scier. rimata*, n. sp.

Both sexes 15-17 mm. Head in male whitish, in female tinged with ochreous-greyish. Palpi white, second joint grey except at apex and towards base, terminal joint $\frac{2}{3}$-$\frac{3}{4}$, anterior edge grey. Antennæ in male whitish, in female grey. Thorax pale greyish-ochreous. Abdomen grey-whitish. Legs grey, posterior pair whitish. Forewings elongate, costa gently arched, apex round-pointed, hindmargin extremely obliquely rounded; rather light greyish-ochreous, in male more or less suffusedly irrorated with white, especially in disc, in female irrorated with fuscous; costa suffused with white from base to $\frac{3}{4}$; a distinct dark fuscous dot in disc at $\frac{2}{3}$; cilia whitish-ochreous, on costa whitish. Hindwings light grey, apical margin whitish-ochreous; cilia whitish-ochreous.

Sydney and Bathurst (2,500 feet), New South Wales; Campbelltown and Georges Bay, Tasmania; Port Lincoln, South Australia; common from November to January, and in March.

78. *Scier. silvicola*, n. sp.

Both sexes 12-14 mm. Head white, more or less sprinkled with grey. Palpi blackish, apex of second joint white, terminal

joint $\frac{2}{3}$, white, anterior edge dark fuscous. Antennæ dark grey. Thorax whitish, irrorated with grey, beneath in male with a long slender expansible hairpencil on each side in front. Abdomen grey-whitish. Legs dark fuscous, posterior pair grey-whitish. Forewings elongate, costa gently arched, apex pointed, hindmargin extremely obliquely rounded; fuscous-grey, sprinkled with darker, and densely irrorated with white, especially in disc, where it tends to form a longitudinal suffusion; costa suffusedly rather darker; a dark fuscous dot in disc before middle, a second on fold obliquely before first, and a third in disc at $\frac{2}{3}$: cilia pale grey. Hindwings grey; cilia pale grey.

Sydney, New South Wales; common in February and March.

79. *Scier. serina*, n. sp.

Male 20 mm. Head, palpi, antennæ, thorax, and legs dark grey; face and posterior legs grey-whitish; terminal joint of palpi almost 1. Forewings elongate, costa gently arched, apex roundpointed, hindmargin extremely obliquely rounded; dark grey; some blackish scales, tending to form an ill-defined dot in disc at $\frac{1}{3}$, a second on fold obliquely beyond it, and a third in disc at $\frac{2}{3}$: cilia dark grey. Hindwings grey, becoming darker towards hindmargin; cilia grey.

Bathurst (2,500 feet), New South Wales; in March, one specimen.

80. *Scier. oxyptera*, n. sp.

Both sexes 12-18 mm. Head whitish, sometimes partially greyish or ochreous-tinged. Palpi white, generally more or less grey anteriorly, terminal joint $\frac{1}{2}$-$\frac{2}{3}$. Antennæ grey. Thorax ochreous-whitish. Abdomen whitish. Legs dark fuscous, posterior pair whitish. Forewings elongate, narrow, costa gently arched, apex very acute, produced, hindmargin siuuate, extremely oblique; fuscous-grey, darker on costal half, in male more ochreous-tinged, dorsal third in male paler and whitish tinged throughout; a moderate snow-white streak along costa from base to near apex, leaving costal edge fuscous from near base to $\frac{3}{4}$: cilia pale whitish-fuscous, white on costa above apex of streak. Hindwings grey or grey-whitish; cilia pale grey or whitish, in male pale greyish-ochreous.

Sydney, New South Wales; Mount Lofty, South Australia; Albany, West Australia; in October and December, five specimens. My materials for this species are somewhat discordant, and I may have possibly confused more than one; they comprise three small dark females with grey hindwings from Sydney, one large female with whitish hindwings from Albany, and one more ochreous-tinged male from Mount Lofty; further discoveries will

show whether these are anything more than slight geographical forms. I regard the first-mentioned form as the type.

18. Procometis, n. g.

Head smooth; ocelli absent; tongue developed. Antennæ moderate, in male filiform or serrate, simple, basal joint moderately elongate, without pecten. Labial palpi very long, recurved, second joint with appressed scales, terminal joint almost as long as second, slender, acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen moderate. Posterior tibiæ rough-haired above. Forewings with vein 1 furcate towards base, 2 from $\frac{2}{3}$, 3 from angle, 7 and 8 stalked, 8 to costa or apex, 11 from middle. Hindwings over 1, trapezoidal, apex roundpointed, costa in male clothed with very long hairs on basal half lying beneath forewings, 1*b* densely haired towards base, shortly furcate at base, 3 and 4 from a point or short-stalked, 5 parallel, 6 and 7 from a point or short-stalked, 8 connected with cell at a point towards base.

1. Forewings with apex acute. 2.
   " " " obtuse. 5.
2. Forewings with costa whitish-yellowish. 83. *lipara*.
   " " " white. 3.
3. Forewings with costal white streak suffused. 84. *hylonoma*.
   " " " " " sharply defined. 4.
4. Forewings with central white streak as broad as costal. 81. *bisulcata*.
   " " " " " much slenderer than costal. 82. *monocalama*.
5. Hindwings yellow ochreous. 85. *genialis*.
   " fuscous-grey. 86. *diplocentra*.

81. *Proc. bisulcata*, n. sp.

Both sexes 17-20mm. Head ochreous-brownish. Palpi ochreous-fuscous, base whitish. Antennæ dark fuscous. Thorax ochreous-fuscous. Abdomen ochreous-whitish. Legs fuscous, posterior pair ochreous-whitish. Forewings elongate, costa gently arched, apex acute, hindmargin faintly sinuate, extremely oblique; ochreous-fuscous or brownish-ochreous; a silvery-white streak along costa from base almost to apex; a straight central longitudinal silvery-white streak from base to hindmargin beneath apex, more or less suffused on lower edge, sometimes tending to become obsolete posteriorly: cilia whitish-ochreous. Hindwings in male whitish-ochreous, posteriorly fuscous-tinged, in female fuscous, paler towards base; costal hairs of male whitish-ochreous, forming a dense pencil lying along upper surface on costa; cilia whitish-grey-ochreous.

Sydney, New South Wales, in January and February; four specimens.

82. *Proc. monocalama*, n. sp.

Female 18mm. Head light grey, with a few white scales. Palpi dark grey, basal half and extreme apex of second joint white. Antennæ dark fuscous. Thorax fuscous. Abdomen pale grey. Legs dark fuscous, posterior tibiæ fuscous-whitish. Forewings elongate, costa gently arched, apex acute, hindmargin sinuate, extremely oblique; ochreous-fuscous, irrorated with whitish; a snow-white streak along costa from base to near apex, bordered beneath by a broader rather dark ochreous-fuscous streak without white irroration, extending from base to apex; a short white longitudinal dash on lower margin of the dark streak about middle or obscurely continued to base: cilia pale ochreous-greyish, with some white scales. Hindwings rather light fuscous; cilia whitish-fuscous.

Sydney, New South Wales, in February; one specimen.

83. *Proc. lipara*, n. sp.

Both sexes 17-22 mm. Head pale ochreous-yellowish, crown sometimes deeper yellow. Palpi fuscous, second joint somewhat sprinkled with pale yellowish. Antennæ dark fuscous. Thorax dark fuscous, patagia pale ochreous-yellowish except at base. Abdomen grey. Legs dark fuscous, posterior tibiæ whitish-yellowish. Forewings elongate, costa moderately arched, apex acute, hindmargin sinuate, very oblique; rather dark fuscous; a pale ochreous-yellowish or whitish ochreous rather irregular suffused streak along costa from base to apex, leaving costal edge dark fuscous on anterior half; a similar median streak from base to $\frac{1}{2}$, sometimes dilated so as to coalesce more or less entirely with costal; some whitish-ochreous scales towards hindmargin beneath apex, sometimes forming a small suffusion, or increased so as to coalesce with apex of median streak: cilia fuscous, on costa whitish-yellowish. Hindwings rather dark fuscous-grey; cilia fuscous, with a darker subbasal line.

Sydney, Blackheath (3,500 feet), and Bathurst (2,500 feet), New South Wales; from January to March, common.

84. *Proc. hylonoma*, n. sp.

Both sexes 18-25 mm. Head whitish-ochreous. Palpi white, irrorated with ochreous-fuscous on upper half of second joint, and on terminal joint anteriorly. Antennæ whitish, annulated with dark fuscous. Thorax whitish-ochreous, sprinkled with fuscous. Abdomen whitish-ochreous. Legs ochreous-whitish, anterior pair fuscous. Forewings elongate, costa moderately arched, apex pointed, hindmargin almost straight, very oblique; white, more

or less irrorated irregularly with ochreous-fuscous, sometimes suffused with whitish-ochreous on dorsal half; a fuscous dot on fold beneath middle, and another in disc at ⅓, sometimes very indistinct: cilia pale ochreous, sprinkled with whitish. Hindwings light fuscous, darker towards hindmargin, paler and more whitish-ochreous towards base; cilia whitish-ochreous, with a light fuscous line.

Sydney and Bathurst (2,500 feet), New South Wales; Kangaroo Island, South Australia; in December and January, common.

85. *Proc. genialis*, n. sp.

Male 19-20 mm. Head, palpi, antennæ, thorax, and legs fuscous-whitish, densely irrorated with blackish; posterior legs pale yellowish. Abdomen light ochreous-yellowish. Forewings elongate, costa moderately arched, apex obtuse, hindmargin very obliquely rounded; ashy-white, densely irrorated with blackish; markings obscure, fuscous, irrorated with black; a short longitudinal dash in disc about middle; a longitudinal streak above inner margin from from ⅓ to anal angle, interrupted in middle of wing, and a less marked streak along inner margin and hindmargin from base to apex; a small cloudy roundish ochreous spot in disc at ⅔: cilia whitish, irrorated and indistinctly barred with dark fuscous. Hindwings yellow-ochreous, somewhat fuscous-tinged, especially posteriorly; cilia whitish-ochreous, with an ochreous basal line.

Sydney, New South Wales; in November, two specimens.

86. *Proc. diplocentra*, n. sp.

Male 19-20 mm. Head, palpi, antennæ, thorax, and legs whitish, irrorated with blackish-grey; posterior tibiæ whitish. Abdomen grey-whitish, base of segments grey, sides of two or three basal segments with some orange scales. Forewings elongated, costa slightly arched, apex obtuse, hindmargin very obliquely rounded; ashy-whitish, densely irrorated with dark fuscous, and with scattered black scales; two cruciform small dark fuscous spots, transversely placed and confluent, in disc before middle, and a third, somewhat larger, in disc at ⅔; a series of short obscure darker marks before hindmargin: cilia whitish, mixed with grey, and with a grey subapical line, basal third white more or less distinctly barred with dark fuscous. Hindwings fuscous-grey; cilia whitish-fuscous, with a well-marked fuscous line near base.

Duaringa, Queensland; two specimens received from Mr. G. Barnard.

19. Hypertricha, n. g.

Head smooth; ocelli absent; tongue developed. Antennæ moderate, in male filiform, simple, basal joint moderate, without pecten. Labial palpi moderately long, curved, ascending, second joint with rough scales beneath projecting towards apex, terminal joint very short, $\frac{1}{4}$ of second, acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen moderate. Posterior tibiæ rough-haired above. Forewings with vein 1 furcate towards base, 2 from $\frac{1}{3}$, 3 from angle, 7 absent (coincident with 8), 11 from middle. Hindwings $1\frac{1}{4}$, subtriangular, apex rounded, costa in male with extremely long hairs from basal half lying beneath forewings, 1*b* densely haired towards base, shortly furcate at base, 3 and 4 short-stalked, 5 parallel, 6 and 7 from a point, 8 connected with cell at a point towards base.

87. *Hyp. ephelota*, n. sp.

Male 24 mm. Head and thorax light fuscous, mixed with ochreous-whitish. Palpi fuscous irrorated with white, lower half of second joint white. Antennæ fuscous. Abdomen brownish-ochreous, basal half light grey with three incomplete dull reddish bands. Legs dark fuscous, apex of joints ochreous-whitish, posterior pair ochreous-whitish. Forewings elongate, costa strongly arched, apex round-pointed, hindmargin extremely obliquely rounded; fuscous, irregularly strewn with ashy-whitish scales; an ill-defined dot of dark fuscous scales on submedian fold at $\frac{1}{4}$, a second in middle of disc, a third on fold beneath second, a fourth in disc at $\frac{3}{4}$, and traces of a fifth on fold towards anal angle; second and fourth connected by an ashy-whitish streak, and a less marked similar streak connecting the other three; some dark fuscous scales on veins posteriorly: cilia fuscous mixed with whitish. Hindwings fuscous; costal hairs bright ochreous towards base; cilia pale fuscous, with a darker basal line.

Mount Lofty, South Australia; one specimen.

20. Phylomictis, n. g.

Head with appressed hairs; ocelli absent; tongue well-developed. Antennæ moderate, in male shortly ciliated ($\frac{1}{3}$), basal joint short, without pecten. Labial palpi moderate, curved, ascending, smooth-scaled, terminal joint much shorter than second, acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen moderate. Posterior tibiæ rough-haired above and beneath. Forewings with vein 1 furcate towards base, 2 from near angle, 3 and 4 stalked, 7 and 8 stalked, 7 to apex, 11 from middle. Hindwings $1\frac{1}{4}$, oblong-ovate, towards base below median and towards inner margin clothed with long hairs,

1*b* shortly furcate at base, 3 and 4 moderately stalked, 5 approximated to 4 at base, 6 and 7 stalked, upper margin of cell bent up before angle, connected with 8 by bar on bend.

This genus is valuable genetically as showing without doubt the connection between the following genus and the rest of the family; without it, *Agriophara* would stand very isolated. If *Agriophara* is regarded as the terminal of an offset from the main stem, then *Phylomictis* is a remnant of the lower portion of the same offset.

88. *Phyl. maligna*, n. sp.

Male 23 mm. Head ochreous-whitish, mixed with grey on crown. Palpi whitish, irregularly sprinkled with dark grey. Antennæ whitish, annulated with dark grey. Thorax dark grey, towards posterior extremity grey-whitish. Abdomen dark grey, sides and apex ochreous-whitish. Legs dark grey. Apex of joints and posterior tibiæ ochreous-whitish. Forewings elongate, costa gently arched, apex obtuse, hindmargin very obliquely rounded; white, slightly ochreous-tinged; a thick irregular dark grey streak along inner margin from base to anal angle; an irregular much interrupted dark fuscous transverse line from $\frac{1}{3}$ of costa to dorsal streak beyond middle; a dark fuscous dot in disc at $\frac{2}{3}$; apical $\frac{2}{5}$ of wing wholly fuscous, sprinkled with darker fuscous, and with curved subterminal and hindmarginal series of obscure whitish marks: cilia whitish, basal half barred with fuscous. Hindwings fuscous, darker towards hindmargin; cilia light fuscous, tips more whitish.

Melbourne, Victoria; one specimen received from Mr. G. H. Raynor.

21. Agriophara, Ros.

Head with appressed hairs; ocelli absent; tongue well-developed. Antennæ moderate, in male filiform, ciliated with long fascicles (3-4), basal joint moderate, without pecten. Labial palpi moderate, curved, ascending, second joint with appressed scales, somewhat rough beneath, terminal joint shorter than second, smooth, acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen moderate. Posterior tibiæ rough-haired above and beneath. Forewings with vein 1 furcate towards base, 2 from $\frac{5}{6}$ or near angle, 7 and 8 approximated at base, 7 to apex, 11 from middle. Hindwings $1\frac{1}{2}$, subovate, towards base below median and towards inner margin clothed with long hairs, 1*b* shortly furcate at base, 3 and 4 from a point or short-stalked, 5 approximated to 4 at base, 6 and 7 stalked, upper margin of cell bent up before angle so as nearly to touch 8, connected with it by bar on bend, with a short connecting furrow beneath bend.

A curious genus. The species are dull-coloured and often very similar, so that considerable care is required in separating them.

1. Forewings with brownish blotches. 89. *confertella.*
" without " " 2.
2. Forewings appearing blackish or dark fuscous. 3.
" " grey. 4.
3. Forewings with blackish streaks or spots. 93. *atratella.*
" without " " " 92. *capnodes.*
4. Forewings with a roundish darker spot in disc posteriorly. 90. *gravis.*
" without " " 5.
5. Forewings with a short oblique black streak from base of costa. 6.
Forewings without " " " 7.
6. Forewings with ill-defined longitudinal dark streak below middle. 95. *cinerosa.*
Forewings without " " 96. *axesta.*
7. Hindwings wholly ochreous-whitish. 91. *horridula.*
" more or less grey. 8.
8. Expanse of wings over 30 mm. 94. *cinderella.*
" " under 20 mm. 9.
9. Hindwings in male whitish anteriorly. 98. *fascifera.*
" " wholly grey. 97. *diminuta.*

89. *Agr. confertella*, Walk.

(*Cryptolechia confertella*, Walk. 758.)

Female 27 mm. Head, palpi, and thorax whitish, finely irrorated with dark fuscous; palpi with lower half of second joint dark fuscous. Antennæ grey. Abdomen light fuscous. Legs white, banded with dark fuscous irroration, tarsi dark fuscous with white rings at apex of joints. Forewings elongate-oblong, costa strongly arched, apex obtuse, hindmargin very obliquely rounded; whitish, partially tinged with pale grey, and finely irrorated throughout with blackish; a brown oblique fascia-like spot from costa about $\frac{1}{3}$, somewhat dilated downwards, reaching to below middle of disc, containing a blackish suffusion towards its lower extremity; a roundish brown blotch in disc about $\frac{2}{3}$, including a longitudinal suffused blackish streak, and confluent posteriorly with a smaller brown blotch on middle of hindmargin; a sinuate fuscous line from middle of costa to centre of blotch at $\frac{2}{3}$; an ill-defined blackish-fuscous denticulate line from $\frac{1}{3}$ of costa to inner margin before anal angle, very strongly curved outwards so as to approach margin throughout, followed on costa by two or three small spots of brownish suffusion: cilia whitish, barred with brownish and partially irrorated with black.

Hindwings fuscous, somewhat lighter anteriorly; cilia fuscous-whitish, with a fuscous line.

Sydney, New South Wales; in October, two specimens.

90. *Agr. gravis*, n. sp.

Both sexes 26-27 mm. Head, palpi, antennæ, and thorax white, densely irrorated with dark fuscous; palpi with lower half of second joint dark fuscous. Abdomen pale grey. Legs dark grey, apex of joints and posterior tibiæ whitish. Forewings elongate, costa rather strongly arched, apex rounded, hindmargin very obliquely rounded; fuscous-grey, densely irrorated with white; some short streaks of blackish scales on veins in disc and towards hindmargin, the latter forming a strongly curved transverse series; a blackish dot in disc before $\frac{1}{2}$; a dark fuscous suffused spot immediately beyond this, and a smaller one on middle of hindmargin, nearly confluent: cilia whitish, with rows of fuscous-grey points, and an interrupted blackish line near base. Hindwings fuscous-grey, lighter anteriorly; cilia grey-whitish, with two faint grey lines.

Sydney, New South Wales; Deloraine, Tasmania; from September to November, six specimens. Recognisable by the suffused dark fuscous posterior spot in disc, which, though ill-defined, is always sufficiently conspicuous.

91. *Agr. horridula*, n. sp.

Male 18 mm. Head and antennæ very pale greyish-ochreous. Palpi ochreous-grey-whitish, lower half of second joint fuscous. Thorax pale greyish-ochreous irrorated with grey, posterior margin ochreous-whitish. Abdomen pale whitish-ochreous. Legs ochreous-whitish, anterior pair fuscous, middle pair banded with fuscous. Forewings elongate, costa moderately arched, apex obtuse, hindmargin obliquely rounded; whitish-ochreous, densely irrorated with light fuscous and whitish; an oblique transverse bar of raised scales in disc at $\frac{2}{3}$, and a direct similar bar at $\frac{3}{4}$; an indistinct fuscous streak from costa at $\frac{1}{4}$ to apex of first bar, and another from middle of costa to apex of second; a short fuscous dash in disc beneath middle; a strongly curved series of small subconfluent fuscous spots from costa beyond middle to anal angle: cilia ochreous-whitish, basal half barred on hindmargin with very pale brownish, on costa with fuscous. Hindwings ochreous-whitish, posteriorly slightly fuscous-tinged: cilia whitish.

Sydney, New South Wales; one specimen in March. Very distinct by the ochreous-whitish general colouring; the raised scales in disc are also a well-marked characteristic, of which traces only are perceptible in other species.

92. *Agr. capnodes*, n. sp.

Both sexes 23-25 mm. Head, palpi, antennæ, and thorax dark

fuscous, slightly sprinkled with whitish-ochreous. Abdomen pale whitish-fuscous. Legs dark fuscous, posterior pair fuscous-whitish. Forewings elongate, costa in male gently, in female moderately arched, apex rounded, hindmargin very obliquely rounded; fuscous, densely irrorated with dark fuscous; a series of faint longitudinal dark marks before hindmargin: cilia fuscous, basal half irrorated with dark fuscous. Hindwings whitish-fuscous, towards apex somewhat darker; cilia whitish-fuscous, with a darker line, tips white.

Mount Lofty, South Australia; three specimens. Distinguished from all others by the apparently nearly uniform dark fuscous forewings.

93. *Agr. atratella*, Walk.

(*Acrobasis atratella*, Walk. Suppl. 1712.)

Male 15-19 mm. Head, palpi, antennæ, and thorax blackish-fuscous. Abdomen whitish-grey. Legs dark fuscous, apex of joints and posterior tibiæ grey-whitish. Forewings elongate, costa gently arched, apex rounded, hindmargin very obliquely rounded; dark fuscous, somewhat purple-shining, with a few scattered whitish-grey scales; disc irregularly mixed with black, tending to form short streaks on veins; a very minute, sometimes obsolete, whitish dot in disc at $\frac{2}{3}$; a series of indistinct blackish spots beneath costa from $\frac{1}{4}$ to near apex, thence curved round near hindmargin to anal angle: cilia dark fuscous, basal half irrorated with blackish, with obscure ill-defined grey-whitish bars. Hindwings light grey; cilia whitish-grey.

Newcastle and Blackheath (3,500 feet), New South Wales; from September to November, five specimens. Easily separated from the preceding by the blackish markings and smaller size.

94. *Agr. cinderella*, Newm.

(*Chimabacche cinderella*, Newm., Trans. Ent. Soc. Lond. (N.S.) III., 288.)

Both sexes 35 mm. Head, palpi, antennæ, and thorax ashy-grey. Forewings ashy-grey, irrorated with black; disc with several short black streaks; a curved series of lunate blackish spots near hindmargin; a hindmarginal row of black dots. Hindwings paler grey.

Melbourne, Victoria. The above description is taken from Newman; I have seen specimens of this species, but do not possess it, and omitted to take any description from them; it is immediately recognisable by its large size.

95. *Agr. cinerosa*, Ros.

Agriophara cinerosa, Ros., Ann. Mag. Nat. Hist. 1885, 439.)

Both sexes 20-22 mm. Head, palpi, antennæ, and thorax whitish, densely irrorated with dark fuscous. Abdomen pale

whitish-fuscous. Legs dark fuscous, apex of joints whitish, middle tibiæ irrorated with ochreous-whitish, posterior tibiæ ochreous-whitish. Forewings elongate, rather narrow, costa gently arched, apex rounded, hindmargin very obliquely rounded; fuscous, densely irregularly irrorated with white and black; an indistinct blackish short very oblique streak from base of costa; two very obscure oblique darker streaks from costa at $\frac{1}{3}$ and middle; a very obscure ill-defined darker longitudinal streak in disc below middle from base to hindmargin, finely attenuated anteriorly, obscurely interrupted at $\frac{2}{3}$; above interruption an obscure white dot, followed by black scales: cilia white, with rows of grey points towards tips, basal half irrorated with blackish, forming obscure bars. Hindwings light fuscous-grey, darker towards apex; cilia fuscous-whitish, with a fuscous line.

Sydney, New South Wales; Wirrabara, South Australia; in October, five specimens. Narrower-winged than the two following species, specially characterised by the dark submedian streak.

96. *Agr. axesta*, n. sp.

Both sexes 19-21 mm. Head, palpi, and thorax dark grey, more or less irrorated with whitish. Antennæ grey. Abdomen pale whitish-fuscous. Legs dark fuscous, apex of joints and posterior tibiæ whitish, middle tibiæ irrorated with whitish. Forewings elongate, moderate, costa moderately arched, apex rounded, hindmargin very obliquely rounded; fuscous-grey, irrorated with white; a short black attenuated very oblique streak from base of costa, margined beneath with white towards base; three transverse series of very obscure marks formed by a blackish irroration; first nearly straight, from $\frac{1}{4}$ of costa to submedian fold before middle; second from middle of costa very obliquely outwards to disc at $\frac{3}{4}$, where it is curved abruptly round and terminates in disc at $\frac{3}{4}$, with some irregular marks beneath it; third from $\frac{3}{4}$ of costa very obliquely outwards, near apex bent round and continued near hindmargin to anal angle: cilia whitish with rows of fuscous points, with a dark fuscous interrupted line near base. Hindwings fuscous-grey, lighter towards base; cilia fuscous-whitish, with a fuscous line.

Wirrabara, South Australia; in October, common. Very like the following, but somewhat larger, and readily distinguishable by the short black streak from base of costa; the markings also differ in detail when closely examined, and the species are unquestionably distinct.

97. *Agr. diminuta*, Ros.

(*Agriophara diminuta*, Ros., Ann. Mag. Nat. Hist., 1885, 440.)

Both sexes 16-18mm. Head, palpi, antennæ, and thorax grey, irrorated with whitish. Abdomen light grey. Legs dark fuscous,

apex of joints and posterior tibiæ whitish, middle tibiæ irrorated with whitish. Forewings elongate, costa gently arched, apex rounded, hindmargin nearly straight, very oblique; fuscous-grey, irrorated with whitish; a short blackish dash beneath costa near base, and another on submedian fold at $\frac{1}{3}$; three transverse series of obscure marks formed by a blackish irroration; first straight, from $\frac{1}{4}$ of costa to $\frac{3}{4}$ of inner margin; second from middle of costa very obliquely outwards to $\frac{3}{4}$ of disc, thence sharply angulated and continued to middle of inner margin, crossing first on fold; third from $\frac{3}{4}$ of costa very obliquely outwards to near apex, thence curved round near hindmargin to anal angle: cilia grey-whitish, basal half barred with fuscous. Hindwings grey, somewhat darker towards apex; cilia light grey.

Launceston, Tasmania; in January, common. The basal black streak appears here only as a very short dash which does not reach the costa, and the similar dash in disc anteriorly is also a characteristic mark.

98. *Agr. fascifera*, n. sp.

Both sexes 13-14mm. Head, palpi, antennæ, and thorax white, densely irrorated with dark fuscous. Abdomen fuscous-whitish. Legs dark grey, apex of joints and middle and posterior tibiæ whitish. Forewings elongate, rather narrow, costa slightly arched, apex rounded, hindmargin very obliquely rounded; white, finely irrorated with black and coarsely with fuscous, tending to form short longitudinal streaks; a faintly defined somewhat darker streak from middle of costa very obliquely outwards to $\frac{1}{2}$ of disc, thence acutely angulated and continued to middle of inner margin; a series of small dark longitudinal marks from $\frac{2}{3}$ of costa very obliquely outwards to near apex, thence curved round near hindmargin to anal angle: cilia whitish, basal half indistinctly barred with dark fuscous. Hindwings in male whitish, semitransparent, towards apex grey, in female grey, paler and thinly scaled anteriorly; cilia whitish-grey.

Sydney and Bathurst (2,500 feet), New South Wales, from September to November, and in March; five specimens. Readily distinguished by the small size, comparatively narrow forewings, and the whitish hindwings of male.

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Further Notes on Australian Coleoptera, with Descriptions of New Genera Species.

By the Rev. T. Blackburn, B.A.

[Read May 6, 1890.]

VII.

The twelve species described in the following pages are nearly all of exceptional interest, five of them requiring new generic names, two of them representing a "tribe" (in Lacordaire's sense of the word) of Curculionidæ not previously recorded as Australian, and another *(Dyschirius)* pertaining to a very widely distributed genus not previously recorded as South Australian.

CARABIDÆ.

TRIGONOTHOPS.

The difference between *T. plagiata*, Germ., and *lineata*, Dej., seems to consist mainly in the width and length of the black vittæ on the elytra; both being from South Australia (Adelaide district and Kangaroo Island), I suspect they are identical; *lineata*, Dej., is the older name.

T. flavofasciata, Chaud., seems to vary almost infinitely in markings; I do not possess an example coloured quite like the type, but have the var. *nigro-signata*, Chaud., with less dark colour than the type and other vars. with black markings much in *excess* of the type; the species seems to have a wide range (the extreme localities of my examples are Victoria and the Lake Eyre basin), but does not appear to be very common. *T. longiplaga*, Chaud., must be extremely like *T. pallidicollis*, Macl., but the description of the latter is hardly detailed enough to justify a decided opinion that species from such widely separated localities are identical.

DYSCHIRIUS.

D. Torrensensis, sp. nov. Rufo-ferrugineus, elytris pedibusque pallide testaceis (basi obscure triangulariter rufescenti, apice obscure picescenti), mandibulis apice corpore subtus (prosterno excepto) et prothoracis pedunculo piceis; clypeo antice emarginato: capite lævi antice inæquali; prothorace rotundato; elytris oblongo-ovatis convexis postice angustatis sat fortiter striatis, striis fortiter punctulatis, postice et striis et puncturis obsoletioribus, interstitiis subconvexis 3°, 5°, 7° que

punctis setiferis seriatim instructis); tibiis anticis extus dentibus 2 acutis parvis instructis et processu elongato apicali productis. Long., 2 l.; lat., $\frac{1}{10}$ l.

The surface sculpture of the head is complicated and very difficult to describe; the most conspicuous prominence is a ridge which runs down the middle, commencing quite indefinedly a little in front of the level of the hind margin of the eyes and narrowing forward (while becoming better defined) till it ends in quite a sharp point about the level of the front of the eyes; a longitudinal furrow traverses the middle of this ridge. The uppermost tooth on the external margin of the front tibiæ is very small indeed, being scarcely more than half as large as the lower one, which itself is but small.

As I do not possess a type of any of the previously described Australian *Dyschirii* I must compare this species with a common European species of the genus (*D. thoracicus*, Rossi). Apart from the totally different colouring, it is a stouter-looking insect than *D. thoracicus*, with longer mandibles, antennæ scarcely so stout, longitudinal channel of prothorax all but untraceable, elytra less narrowed (and more abruptly declivous) at the base, with very much stronger sculpture, the lower of the two external teeth on the front tibiæ somewhat smaller.

D. Torrensensis seems to resemble *D. zonatus*, Putz. (from N. Queensland), and to be extremely unlike *D. Mastersi*, Macl., and *D. Stephensi*, Macl. Apart from differences of marking (which may be variable), the present insect appears to differ from *D. zonatus, inter alia*, in the front margin of the clypeus being (not truncate, but) emarginate, in the elytra being (not depressed behind the scutellum, but) very evenly convex, and without a humeral tooth, and in the front tibiæ externally having (not two strong teeth, but) two rather exceptionally feeble teeth.

S. A.; banks of the Torrens near Woodville.

LAMELLICORNES.

PHYLLOTOCUS.

P. dispar, sp. nov. ♂ (?) Niger, subolivaceus; hirtus; antennis, palpis, pedibus (tarsis exceptis), segmentis ventralibus, pygidioque, flavis; elytrorum disco livido-brunneo; capite confertim fortiter rugulose, prothorace (hoc quam longiori paullo latiori) sat crasse minus crebre, elytris (his leviter striatis) subtilius subseriatim, pygidio (hoc ad apicem late leviter impresso) antice fortiter sparsius postice crebre obscure, corpore subtus sat fortiter (coxis posticis minus elongatis lævigatis exceptis) punctulatis. Long., 3$\frac{3}{4}$ l.; lat., 1$\frac{1}{3}$ l.

An extremely distinct species — perhaps nearest to *P. erythropterus*, Blanch., but with totally different coloration and puncturation. The pubescence is almost as in that species, but evidently shorter on the elytra; the hairs on the sides, undersurface and base of prothorax are white, the rest darker. The prothorax is longer and narrower than in *erythropterus*. The livid brown colour of the elytra covers most of the surface, the dark margin of each elytron being narrow and obscure except on the lateral margins and apex. The anterior tibiæ have two strong sharp teeth (one of them being the apical projection) externally.

This insect does not seem quite at home in *Phyllotocus;* the hind coxæ are exceptionally short, being scarcely longer on the external margin than the metasternum; the elytra do not quite reach the apex of the propygidium; the style of marking and colouring is nearest that of the glabrous species (Sir W. Macleay's "first section" of the genus), while the pubescence is exaggeratedly of the type of the second section; there is, moreover, nothing of the silky opacity so general in the hairy species of the genus. The general resemblance in colour and shape and puncturation to *Macrothops rostrata*, Macl., is extremely close, but the clypeus, palpi and antennæ are at least *very like* those of a *Phyllotocus* of the second section, though having only a single specimen I have not been able to dissect the head, and so cannot be sure of actual identity. The examination of a series of both sexes might probably justify the creation of a new generic name. I have considered the possibility of this being the undescribed sex of *Macrothops*, but if so the less dentate anterior tibiæ and short elytra would point to its being the male, whereas the much less complicated clypeus and short palpi would seem inconsistent with that supposition. In any case the yellow hind body and legs would seem to distinguish specifically from *M. rostrata*.

Western Australia; presented to me by C. French, Esq., Victorian Colonial Entomologist.

LEPIDIOTA.

In writing on this genus in the Proceedings of the Linnean Society of New South Wales (Vol. III. Ser. 2 pp. 848-855) I stated that unless I had seen examples only of one sex the sexual distinctions were very slight; I am now fairly sure that I have before me both sexes of two species belonging to it (*L. Darwini*, Blackb. and an undescribed one), and an examination of these specimens confirms me in the opinion I previously expressed. Unfortunately specimens of *Lepidiota* appear to be rare (though the species are relatively numerous), and I have not been able to devote a (supposed) male and female to dissection so as to arrive

at certainty on the question of their sex. In both the species alluded to above the male is a somewhat narrower and more parallel insect than the female, with the flabellum of the antennæ a little longer and the pygidium decidedly shorter, more transverse, and more closely scaly and punctured; in both, moreover, the feeble costæ on the elytra are evidently better defined in the male than in the female, the elytra of the latter sex being more confusedly punctured and less nitid than in the former.

L. caudata, sp. nov. ♂ Sat parallela; piceo-ferruginea, subiridescens; sat nitida; supra sparsissime subtus confertissime albido-squamulata; pectore fulvo-hirsuto; clypeo perbrevi, in medio reflexo-emarginato; prothorace fortiter convexo sat transverso antice angustato, lateribus pone medium angulato-ampliatis postice vix sinuatis, angulis posticis acutis; pygidii margine postico in medio acute minute dentato; tibiis anticis tridentatis. ♀ Minus parallela; haud iridescens; minus nitida; elytris paullo crebrius punctulatis. Long., 12 l.; lat., ♂ 6¼, ♀ 6¾ l.

The sharp little tooth into which the hinder outline of the pygidium is abruptly drawn out in the middle at once distinguishes this species from all the previously described Australian *Lepidiotæ* (unless *Froggatti*, Macl., which I have not seen, but which is a very much larger insect). The third joint of the antennæ (as in most of the Australian *Lepidiotæ*) is longer than the second and than the fourth*; in the male the flabellum is as long as the preceding 5 joints together, in the female a little shorter. In the male the pygidium is about a ⅓ wider at its base than it is long down the middle, and is punctured closely and strongly; in the female the length is scarcely different from the width, and the puncturation is feebler and more sparing. The suture is convex, and there are two somewhat less defined costæ on each elytron—all these convexities being stronger in the male than in the female. The prothorax is about ⅔ again as wide as it is long down the middle, its base being half again as wide as its front, which is bisinuate and strongly margined. The whole upper surface (except the elytral costæ) is rather strongly and evenly and fairly closely punctured; the white scales being extremely small and not filling up the punctures are very inconspicuous, and at the first glance the upper surface appears glabrous (I do not think that the male example before me is at all abraded). The hairs on the breast are not of a snowywhite colour (as they are in *Darwini*, Blackb.), but are pale fulvous.

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*This is at variance with the characters of *Lepidiota*, as quoted by M. Lacordaire in the "Genera des Coleopt."

Queensland; sent to me by Mr. Hurst, of Brisbane, and also by Mr. Duboulay.

L. grata, sp. nov. ♂ (?) Minus parallela; piceo-castanea; subnitida; supra sat dense subtus confertissime albo-squamulata, elytris lineis subconvexis subnudis sat læte ornatis; pectore haud hirsuto; clypeo perbrevi in medio fortiter reflexo emarginato; prothorace sat convexo minus transverso antice angustato, lateribus crenulatis pone medium rotundato-ampliatis postice subsinuatis angulis posticis minus acutis; pygidii margine postico sinuato-truncato, tibiis anticis tridentatis; antennarum articulo 3° 4° æquali. Long., 9 l.; lat., 5 l.

The flabellum of the antennæ is scarcely so long as the preceding 5 joints together. The pygidium across the base is slightly more than half again as wide as it is long down the middle; it is very closely and rather finely punctured and scaly. The suture of the elytra and 4 other sub-parallel lines on the elytra are scarcely convex, but are almost devoid of white scales. The prothorax is about half again as wide as its length down the middle, its base being slightly more than half again as wide as its front, which is simply emarginate and devoid of a raised margin, as also is the middle part of the base; its sides are much more closely and strongly crenulate than in *L. squamulata*, Waterh., *albohirta*, Waterh., and *caudata*, Blackb. The puncturation of the upper surface is fairly close and strong, and the scales are rather coarse, so as to give a general whitish tone except on the denuded lines of the elytra.

Resembles *L. Rothei*, Blackb., *rufa*, Blackb., and *degener*, Blackb., in its non-hirsute breast. It is nearest to *L. Rothei*, from which the equality of the 3rd and 4th joints of the antennæ will *inter alia* distinguish it; the scales on the upper surface of *L. rufa* and *L. degener* are quite fine and hair-like.

Queensland; sent to me by Mr. Oswald B. Lower, of Parkside.

NEOLEPIDIOTA, gen. nov.

A *Lepidiota* differt corpore haud squamulato, tarsis longissimis.

The insect for which I propose this name has been in my collection for a good many years past, during which I have been hoping to obtain more specimens, but as no other has yet come to light it will perhaps be as well to give it a name and publish as much information as possible concerning it. It is evidently very near *Lepidiota*, but the two characters mentioned above are inconsistent with its being placed in that genus. The front tarsi are quite half again, the intermediate nearly half again, and the hind just about, as long as their tibiæ. The upper surface is glabrous, except on the lateral margins, which are fringed with stiff hairs,

and at the base of the prothorax where some ciliæ project hindward; the legs and sterna are moderately hirsute. Having only a single specimen I have not been able to dissect, but as far as I can see the mouth organs are similar to those of *Lepidiota*. The 3rd joint of the antennæ is evidently shorter than the 4th; the clypeus is almost evenly rounded (scarcely sinuate) in front; the prothorax is not bisinuate at the base; and the ventral sutures are so much obliterated that the basal four ventral segments (except quite at the sides) have quite the appearance of being only one large segment; the hind tibiæ have two fairly well-defined oblique carinæ. I cannot form a decided opinion as to the sex of the specimen before me. The flabellum of the antennæ is not quite so long as the preceding five joints together, but the shape of the pygidium resembles that of the male of *Lepidiota*. In respect of all the characters not mentioned above I can find no difference from *Lepidiota*. The shape of the elytra (considerably dilated hindward) and their freedom from scales cause a general appearance suggestive of *Colpochila*, from which genus the strongly dentate claws, obliterated ventral sutures, and many other characters depart widely.

N. obscura, sp. nov. Ovata, sat convexa; minus nitida; rufopicea; prothorace (hoc transverso antice angustato, lateribus sat fortiter crenulatis) sat crebre, elytris (his obscure 3 vel 4 costatis) confuse minus crebre, pygidio sat sparsim, sat leviter punctulatis; metasterno crebre subtiliter punctulato; abdomine (segmento brevi apicali excepto) fere lævigato. Long., 10 l.; lat., 6 l. (vix).

The free margin of the clypeus is strongly reflexed. The prothorax is nearly twice as wide as long, the base being two-thirds again as wide as the front, and the sides being abruptly (and roundly) dilated just behind the middle as in *Lepidiota*; the hind angles are obtuse but quite well defined; both base and front are distinctly margined. The anterior tibiæ are tridentate externally, all the teeth being well defined, but not very sharp. The pygidium is not quite half again as wide as long, and is subvertical.

Australia; I am not quite sure of the exact locality, but I believe it to be in S. Australia.

PSEUDOCAVONUS, gen. nov. *(Oryctomorphides)*.

Mentum fere ut *Nephrodopi*, laminam longitudinalem porrectam efficiens; palpi labiales breves articulo ultimo cylindrico; palpi maxillares elongati sat cylindrici sat graciles, articulo 3° quam 2^{us} breviori, 4° duobus præcedentibus conjunctis minus breviori; antennæ maris 10-articulatæ, articulo 1° brevi apice valde dilatato, articulis 2-7 brevibus, 3-7 sub-

æqualibus fortiter transversis, flabello sat angusto articulis ceteris conjunctis quadruplo longiori; caput haud cornutum sed inter antennas transversim fortiter carinatum; clypeus sat declivis, antice rotundatus, marginibus fortiter reflexis; prothorax maris margine anteriori medio cornutus, basi valde lobatus, disco excavato; tibiæ anticæ acute 3-dentatæ, posteriores sat fortiter dilatatæ extus bicarinatæ; tarsi graciles tibiis sat longiores.

The antennæ resemble those of *Aneurystypus calvus*, Blackb., but their flabellum is longer in comparison with the rest of the organ than in any other *Dynastid* known to me. The maxillary palpi are longer than the basal 7 joints of the antennæ together. The general faciès is nearest to *Cavonus* of genera known to me. Structurally this genus comes nearest, I think, to *Pseudoryctes*, which it resembles very closely in the form of the mentum and of the legs; its clypeus, however, is much less abruptly declivous. From *Teinogenys* (which I do not think I have seen) it appears to differ *inter alia* in its non-tuberculate head, strongly dilated posterior tibiæ and profoundly excavated prothorax. The very strong lobe into which its prothorax is produced behind will, I think, distinguish it from all the previously described genera of *Oryctomorphides*.

P. antennalis, spec. nov. ♂ Sat brevis; sat latus; sat nitidus; supra glaber (pilis longis adpressis, a prothoracis basi orientibus, exceptis), corpore subtus pygidio pedibusque longe dense hirsutis; ferrugineus, pilis pallidioribus, capite prothoracis latera et pedum marginibus carinisque infuscatis; clypeo parce fortiter, prothorace variatim (disco sparsim strigatim, lateribus antice crebre fortiter postice sparsim minus fortiter), scutello leviter obscure, pygidio (in medio lævigato) ad latera crebre leviter, punctulatis; prothoracis cornu lamelliformi in medio angustato-acuto, disco a basi ad apicem late excavato, partis excavatæ lateribus pone medium utrinque obscure tuberculatis; elytris fortiter punctulato-striatis, interstitiis vix convexis hic illic puncturis nonnullis sat magnis instructis. Long., 7—7⅗ l.; lat., 4—4⅘ l.

The coloration of the prothorax (in both the examples before me) is very peculiar, the interior surface of the excavation being of a pale ferruginous tint, while the rest of the surface is blackish-brown, but variegated with some ill-defined ferruginous spaces; the legs are rusty red in colour, but they are outlined with black, and the carinæ of the posterior 4 tibiæ are also black; each joint of the tarsi also has its apex more or less infuscate. The prothoracic excavation is somewhat definitely margined laterally, the margin being somewhat angulated at the point where the quasi-

tubercle is situated. The basal lobe of the prothorax is almost parallel-sided, and occupies about the middle third part of the whole width of the base, and its length is such that the portion behind a straight line joining the hind angles would be about as long as the scutellum. The prothorax is strongly margined all round except along the hinder edge of the excavation, its front angles being well defined but not very sharp, its hind angles much rounded off. The prothoracic horn seems to be formed by the front margin of the excavated part being reflexed upward into a lamina which narrows bisinuously to a somewhat obtuse point in the middle where it is at its highest (this structure is best seen by viewing the insect from a point directly in front of the head). Each elytron bears about 11 punctulate striæ, of which the first is near and parallel to the suture, while the rest are parallel (or nearly so) *inter se*, but run somewhat obliquely from the base hindward towards the suture; the first interstice (which is very wide in front and narrows hindward) bears numerous large punctures; the third a few, and the seventh a good many; the puncturation becomes confused and closer near the apex along the lateral portion.

Roebuck Bay, N.W. Australia; sent to me by Mr. French (Victorian Colonial Entomologist).

ELATERIDÆ.

PSEUDOLACON, gen. nov.

A *Lacon* differt figura angusta sat cylindrica, tarsis aliter conformatis, horum articulo 1° apicem versus sat fortiter, ceteris invicem minus fortiter, dilatatis.

The narrow cylindrical appearance of this insect would prevent its being associated at a first glance with *Lacon*, but on careful examination it seems to be really very near that genus, to which it would be referred by the tabulation of *Agrypnides* in M. Candeze's "Mon. des Elaterides." I think, however, that the shape, in conjunction with the peculiar structure of the tarsi, renders a new name necessary. The tarsi are moderately elongate (as in *Lacon*), but instead of being compressed and of equal width, or nearly so, they are somewhat strongly dilated at the base, and become gradually and strongly narrower to the apex, the last two joints being very slender. Each of the first four joints is in the form of a reversed cone; the tarsus is at its widest at the apex of the 1st joint, the 2nd joint being a little shorter than the 1st and about half as wide, the 3rd scarcely shorter than the 2nd, but narrower, the 4th a little shorter than the 3rd and much narrower, the 5th scarcely shorter than the preceding three together. The undersurface of the tarsi is pubescent, the first two joints of the

hind pair being densely clothed with long stout hairs or bristles. The prosternal projection behind the coxæ is more declivous than in *Lacon*. On the flanks of the prosternum there are feeble indications of a furrow for the reception of the tarsi; on the metasternum no trace whatever of a furrow. The antennæ do not differ notably from those of *Lacon*; they are short (reaching back to about the middle of the prothorax), and scarcely so stout as is usual in *Lacon*. The prosternal sutures are as in *Lacon*. The chin-piece (*mentonnière*) is very robust and almost erect.

P. rufus, sp. nov. Subcylindricus; totus rufus; setulis squami formibus pallidis brevibus sat sparsim vestitus; prothorace quam in medio longiori vix latiori, antice parum angustato, fortiter sat crebre punctulato, prope angulum posticum sat deplanato, lateribus minus arcuatis crenulatis ante basin sinuatis, angulis posticis subrectis lateraliter nec postice paullo productis, basi leviter concava; elytris sat fortiter punctulato-striatis, interstitiis sat angustis subconvexis transversim obscure rugatis vix manifeste punctulatis. Long., 4 l.; lat., $1\frac{1}{8}$ l.

The pallid scales with which the surface is thinly covered, both above and below, are placed for the most part in the punctures.

Roebuck Bay, W. Australia; sent to me by Mr. French.

HOMŒOLACON, gen. nov.

A *Lacon* differt antennis elongatis pectinatis, articulo ultimo in processu apicali subito angustato; tarsis gracilibus elongatis (posticis quam segmenti ventrales 2-4 conjuncti haud brevioribus).

The insect for which I propose this new generic name does not appear to differ notably from *Lacon* in any other respects than those mentioned above; its prothorax, however, is different from that of any *Lacon* known to me, having the sides very strongly rounded in the anterior two-thirds of their length (so that the prothorax a little in front of the base is scarcely wider than across the front margin), and then diverging again to the posterior angles. Of the antennæ joints 4-10 scarcely differ *inter se* in shape or size; each of them is about as long as the 2nd and 3rd joints together, and is strongly transverse, of triangular shape. Thus the entire antenna (which reaches back quite to the base of the prothorax) appears pectinated. The apical joint is suddenly narrowed on its inner side a little beyond its middle, so that its apical part (which is almost cylindrical) looks like a 12th joint, the portion behind the contraction being produced moreover on its inner side much less strongly than the preceding joints, so that it is longer than wide, even excluding the pseudo-12th joint.

otherwise is evenly convex hindward all across) on either side close to the hind angles, which gives to those angles a slight appearance of being directed hindward.

Roebuck Bay, N.W. Australia; sent to me by Mr. French (Victorian Colonial Entomologist).

ACANTHOLOPHUS.

A. Franklinensis, sp. nov. Oblongus; niger; albosquamosus, squamis niveis condensatis lineam longitudinalem a rostro ad elytrorum apicem recurrentem efficientibus; rostro utrinque supra antennarum basin spina longa valida, supra oculum spina trifida perlonga instructo; oculis angustis; antennarum funiculi articulo 2° 1° sat longiori; prothorace spinis acutis 4-seriatim instructis; elytris apice late divaricatis minute mucronatis 7-seriatim tuberculatis vel spinosis [serie 1ª suturali tuberculis parvis obtusis, 2ª tuberculis obtusis paullo majoribus (2 vel 3 posticis conicis acutis), 3ª tuberculis obtusis etiam majoribus (2 posticis permagnis conicis acutis), 4ª 1ª simili sed fere obsoleta, 5ª 1ª simili, 6ª tuberculis sat magnis (anticis obtusis, posticis acutis subspiniformibus), 7ª postice abbreviata tuberculis subspiniformibus, instructis]; pedibus albo-squamosis nigro-setosis.

An extremely distinct species remarkable for the well marked snowy scales with which it is clothed. These cover the rostrum from the base of the antennæ hindward, then continue as a line along the middle of the head, then fill the interval between the dorsal series on the prothorax (in the middle of which nevertheless is a narrow scaleless black line), and then as a narrow line occupy the scutellum and the suture quite to the apex of the elytra; they are also more interruptedly (but still very conspicuously) dispersed over the sides of the prothorax and elytra, form a vitta between the sixth and seventh series of tubercles on the latter, and are thinly sprinkled over the undersurface and the legs. The parts not covered with snowy white scales appear to the naked eye quite black, but are seen under a lens to be thinly sprinkled with brown scales. The head and prothorax bear (no tubercles, but) only large sharp spines; that over the eye is like the antler of a deer, consisting of two long spines (the front one curved forward and upward, the hinder curved upward and hindward, and sending off a short branch anteriorly at about half its length) springing from a common stalk, of which the hinder is the longer, and is scarcely shorter than the distance from its base to the apex of the rostrum; on the prothorax the dorsal series each contains five long sharp spines gradually decreasing hindward, of which the front one is the longest, and is bifid, while each lateral series consists of a spine near the base about as long as the longest of

List of Plants collected during Mr. Tietkens' Expedition into Central Australia, 1889.

By Baron Sir F. von Mueller, F.R.S., &c., and Professor R. Tate, F.L.S., &c.

[Read April 1, 1890.]

Last year Mr. Tietkens was placed in charge of a party by the Central Australian Exploring and Prospecting Company, Adelaide, to explore the MacDonnell Range and the country to the west and south of it. The period of exploration embraced the months of April to August, and the plants, which form the subject of this report, were collected by Mr. Tietkens and his assistants during that time.

As Mr. Tietkens' map and journal are not yet published the approximate position of each locality, referred to in this report, here follows:—

Proceeding northward from Charlotte Waters the localities are:—

Crown Point, on the River Finke, about 40 miles north of Charlotte Waters.

Horse-shoe Bend, 20 miles north of Crown Point.

Orraminna, 40 miles south of Alice Springs.

Emily Gap (in the MacDonnell Range), 8 miles south of Alice Springs.

Burt Plain or the Table-land on the north of the MacDonnell Range, the scarped front of which constitutes that range. See East, Trans. Roy. Soc. S. Aust., vol. xii., p. 47, 1889.

Bonn Springs, 10 miles north-east of Alice Springs.

Painta Springs, 15 miles north-west of Alice Springs.

Thence along the MacDonnell Range are:—

Mount Sonder, long. 132° 20′, lat. 23° 35′. *Mareena Bluff*, *Mount Razorback*, *Glens Helen* and *Farewell* being adjacent thereto.

Glen Edith, long. 131° 10′, lat. 23° 50′.

Thence about west to the boundary line with West Australia.

Watson Hills, about midway between Glen Edith and

Gill's Creek, in Cleland's Hills, long. 130° 30′, lat. 23° 48′.

"Sandstone Rocks," long. 129° 35′, lat. 23° 50′.

Laura Vale, 6 miles from Mount Rennie, in long. 129° 15′, lat. 23° 35′.

Trema cannabina, *Lour.* An Oriental species, reaching as far south as N.W. Victoria; this adds a new genus to the Flora.

Crotalaria incana, *Linne.* An exotic of tropical and sub-tropical distribution; is known throughout the northern half of this continent.

Acacia Bynoeana, *Bentham.* Is known from the coast region of N.A.

Acacia acradenia, *F. v. M.* Inhabits the dry zone from Nickol Bay to the head waters of the Victoria River.

Acacia patens, *F. v. M.* Same distribution as the last.

Heliotropium fasciculatum, *R. Brown.* Inhabits Q. and N.A.

Erechthites lacerata, *F. v. M.*

Rotala verticillaris, *Linne.* An Oriental species, also known from Sturt's Creek.

Ammannia auriculata, *Willdenow.* A tropical and sub-tropical species of the Old World; is known from the littoral tracts of Queensland.

Eucalyptus setosa, *Schauer.* Belongs to the littoral tracts of N.A. and Q.

Grevillea Chrysodendron, *R. Brown.* Confined to the littoral tracts of N.A. and tropical W.A., and of Q.

Oldenlandia galioides, *F. v. M.* Same distribution as the last.

Halgania integerrima, *Endlicher.* W.A., south-eastern interior.

Eremophila viscida, *Endlicher.* W.A., south-eastern interior.

Fuirena glomerata, *Lamarck.* Belongs to the warm regions of both hemispheres; for the most part, a littoral species in N.A., Q., and N.S.W. This is an additional genus to the Flora.

Fimbristylis acuminata, *Vahl.* An Oriental species, reaching to Queensland.

Dilleniaceae.

Hibbertia glaberrima, *F. v. M.* Mount Olga.

Capparideae.

Cleome viscosa, *Linne.* Glen Helen; Mount Razorback; east end of Lake McDonald.

Capparis spinosa, *Linne.* Near Mount Sonder.

Capparis Mitchelli, *Lindley.* Dashwood Creek.

Cruciferae.

Erysimum Blennodia, *F. v. M.* Near Basedow Range and W. of Eringa.

Sisymbrium trisectum, *F. v. M.* Basedow Range; sandhills W. of Erldunda; W. of Eringa.

Stenopetalum nutans, *F. v. M.* Bonn Springs.

sphærocarpa, *F. v. M.* Between Mount Olga and Ayers k.
cochlearina, var. ochrantha, *F. v. M.* Mount Sonder.
n phlebopetalum, *F. v. M.* Glen Helen; Basedow Range; dunda; W. of Eringa.

Violaceae.

us miniatus, *F. v. M.* Gill's Creek.

Pittosporeae.

rum phillyræoides, *DeCand.* W. end of Lake McDonald.

Droseraceae.

Burmanni, *Vahl.* Glen Farewell; Laura Vale.
Indica, *Linne.* With the last.

Elatineae.

erennis, *F. v. M.* Near Mount Sonder.

Hypericineae.

um Japonicum, *Thunberg.* Mount Sonder; W. of cDonnell Range.

Rutaceae.

on argyreus, *F. v. M.* and *Tate.* Near Mount Sonder.

Zygophylleae.

llum fruticulosum, *DeCand.* Mount Harris.
terrestris, *Linne.* Mount Sonder; Ayers Rock.
astrocarpus, *F. v. M.*

Geraniaceae.

cygnorum, *Nees.* Scrub S.E. of Goyder Springs.
rniculata, *Linne.* Mount Sonder.

Malvaceae.

plebeia, *Sims.* Eringa Station.
hus glomeratus, *Bentham.* Lake McDonald.
rugata, *Lindley.*
usa, *Bentham.* Horse-shoe Bend; Warman Rocks.
phiopetala, *F. v. M.* Mount Olga.
dopetala, *F. v. M.* and *Tate.* Glen Helen; Warman ks.
otocarpum, *F. v. M.* Glen Helen; Blood's Range.
halophilum, *F. v. M.* Glen Helen; Laura Vale.
microchlaenus, *F. v. M.* Bonn Springs; near Mount der; Laura Vale.
Pinonianus, *Gaudichaud.* North shore of Lake Donald.

Gossypium Sturtii, *F. v. M.* Orraminna rock-hole; Mount Sonder; near Gill's Creek; Mount Olga.
Gossypium australe, *F. v. M.* Glen Helen; Laura Vale.

Sterculiaceae.

Macregoria racemigera, *F. v. M.* W. end of Lake McDonald.
Brachychiton Gregorii, *F. v. M.* Mareena Bluff.
Melhania incana, *Heyne.*
Hannafordia Bissillii, *F. v. M.* "A shrub two feet high." Glen Edith.
Commerçonia magniflora, *F. v. M.* A shrub eight feet high. Mount Sonder; Mount Olga.
Commerçonia Kempeana, *F. v. M.* Glen Edith; Watson Hills.

Euphorbiaceae.

Euphorbia erythrantha, *F. v. M.* Sandhills, east of Lake McDonald.
Euphorbia Drummondii, *F. v. M.* Mount Razorback; Lake Amadeus.
Euphorbia eremophila, *Cunn.* Emily Gap.
Phyllanthus minutiflorus, *F. v. M.* Glen Helen.
Phyllanthus thesioides, *Bentham.* Burt Plain.
Phyllanthus lacunarius, *F. v. M.* Waterholes, MacDonnell Range.
Phyllanthus trachyspermus, *F. v. M.* Mount Sonder.

Urticaceae.

Trema cannabina, *Lour.* Near Mount Sonder.
Ficus platypoda, *Cunn.* Mount Razorback; Glen Helen.

Casuarineae.

Casuarina Decaisneana, *F. v. M.* Watson Hills; about Lakes McDonald and Amadeus.

Sapindaceae.

Diplopeltis Stuartii, *F. v. M.* Mt. Sonder and vicinity; Mt. Conner; around Lake McDonald.
Dodonaea lanceolata, *F. v. M.* Dashwood Creek.
Dodonæa viscosa, *Linne.* Mt. Sonder; Blood's Range; Mt. Olga; N. of Ayers-Range; W. of Eringa.
Dodonaea microzyga, *F. v. M.* Between Mt. Olga and Ayers Rock; Erldunda; W. of Eringa.

Frankeniaceae.

Frankenia laevis, *Linne.* Lakes McDonald and Amadeus.

Portulaceae.

Portulaca oleracea, *Linne.* Mount Razorback.
Portulaca filifolia, *F. v. M.* Orraminna rock-hole.
Claytonia ptychosperma, *F. v. M.* Eringa.

Caryophylleae.

s synandra, *F. v. M.* Dashwood Creek.

Amarantaceae.

tchelli, *F. v. M.* Orraminna; Mount Olga.
anus, *Poiret.* Mount Sonder; Glen Helen.
ltatus, *Nees.* West of Mt. Sonder.
ipteroides, *F. v. M.* Table-land W. of Eringa.
ilis, *F. v. M.* Mount Sonder.
tifolius, *R. Brown.* Native well at "Sandstone
"
cocoma, *Moquin.* Near Mount Sonder.

Salsolaceae.

esicarium, *Heward.* Granite rocks north of Ayers

simulans, *F. v. M.* and *Tate.* Near Mount Sonder.
utans, *R. Brown.* N. side of Lake McDonald.
m rhadinostachyum, *F. v. M.* Laura Vale.
osa, *Lindley.* Lake McDonald; Erldunda.
aphylla. Erldunda.
ngiocarpa, *F. v. M.* Mount Olga.
olænoides, *F. v. M.* Plains S.W. of Erldunda
i, *Linne.* Common.

Ficoideae.

crystallina, *Vahl.* W. end of Lake McDonald.
pilosa, *F. v. M.* Mount Sonder; W. side of Lake
us.
ta, *Thunberg.* Mount Sonder.
rviana, *Seringe.* Glen Helen.

Polygonaceae.

plebeium, *R. Brown.* Mount Razorback.

Phytolaccaeae.

ramulosus, *Desfont.* Glen Edith; west end of Lake
us.
us cotinifolius, *F. v. M.* Glen Helen; Mount
; Dashwood Creek. A tree twelve feet high.

Nyctagineae.

repanda, *Willd.* N. shore of Lake McDonald.
diffusa, *Linne.* Mount Olga; Bonn and Painta
.

Thymeleae.

crocephala, *R. Brown.* S. end of Lake Amadeus.

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Leguminosae.

Brachysema Chambersi, *F. v. M.* Laura Vale and west of.
Isotropis atropurpurea, *F. v. M.* Mount Olga.
Burtonia polyzyga, *Bentham.*
Crotalaria medicaginea, *Lamarck.* Bonn Springs, Mount Sonder; Laura Vale; Mount Olga.
Crotalaria dissitiflora, *Bentham.* Laura Vale; Gill's Creek.
Crotalaria incana, *Linne.* Near Mount Sonder.
Lotus australis, *Andrews.* Mount Sonder; Laura Vale; Mount Olga.
Psoralea patens, *Lindley.* Mount Olga.
Indigofera viscosa, *Lamarck.* Bonn Springs; Mount Sonder; "Sandstone Rocks;" Warman Rocks.
Indigofera hirsuta, *Linne.* Mounts Sonder and Leisler.
Indigofera monophylla, *DeCand.* Laura Vale; Gill's Creek. A bush one to two feet high.
Indigofera linifolia, *Retzius.* Laura Vale.
Indigofera brevidens, *Bentham.* Mount Leisler; sandhills E. of Lake McDonald.
Clianthus Dampieri, *Cunn.* Erldunda and W. of Eringa.
Glycine clandestina, *Wendland.* Blood's Range.
Glycine sericea, *Bentham.* Glen Helen; Gill's Creek.
Swaisonia coronillifolia, *Salisb.* Scrub S.E. of Goyder's Springs.
Swainsonia Burkei, *F. v. M.* Glen Helen.
Swainsonia stipularis, *F. v. M.* Scrub S.E. of Goyder's Springs.
Kennedya prorepens, *F. v. M.* Near Mount Sonder.
Erythrina vespertilio, *Bentham.* Mount Sonder. "A tree 30-40 feet high, 1-2 feet diameter of stem; deciduous, shedding its leaves after seeding. The wood is exceedingly light, and is used by the natives for shields. Pod about four inches long."
Rhynchosia minima, *De Candolle.* Mount Sonder; Glen Helen.
Vigna lanceolata, *Bentham.* Painta Spring; Glen Helen. Roots eaten by the aboriginals. *V. suberecta*, Bentham, is the better name of the two.
Cassia Sophera, *Linn.* Mount Sonder.
Cassia pleurocarpa, *F. v. M.* Glen Helen.
Cassia desolata, *F. v. M.* Mount Leisler; Laura Vale.
Cassia phyllodinea, *R. Brown.* W. end of Lake Amadeus.
Petalostylis labicheoides, *R. Brown.* Mt. Sonder; Glen Helen.
Acacia Bynoeana, *Bentham.* W. end of Lake Amadeus.
Acacia spondylophylla, *F. v. M.* Mount Sonder.
Acacia strongylophylla, *F. v. M.* Mount Sonder; W. end of Lake Amadeus; Mount Olga.
Acacia pyrifolia, *De Candolle.* Gill's Creek; Laura Vale; sandhills E. of Lake McDonald.

ilis, *F. v. M.* Mount Sonder ; Gill's Creek.
ina, *Lindley.* Mount Sonder ; W. end of Lake
s ; table-land W. of Eringa.
ophleba, *F. v. M.* Sandhills N. of Mount Harris.
s, *F. v. M.* Mt. Sonder. A shrub 5 to 8 feet high.
enia, *F. v. M.* Mount Harris.
toxylon, *Cunningh.* Twelve miles S.E. of Gill's
Mount Olga ; table-land W. of Eringa.
a, *F. v. M.* W. of Lake Amadeus ; table-land W.
ga.
ophylla, *F. v. M.* Warman Rocks.
esiana, *Willdenow.* Mount Sonder.

Rosaceae.

spathulatum, *Desfontaines.* Erldunda.

Salicariae.

illaris, *Linne.* West of Macdonnell Range.
nultiflora, *Roxburgh.* Mount Sonder.
uriculata, *Willdenow.* Mount Sonder.

Haloragеae.

pera, *Lindley.* Mount Sonder.
ssei, *F. v. M.* N. side of Lake McDonald.

Myrtaceae.

longiflora, *F. v. M.* Sandhills N. of Mount Harris.
Maisonneuvii, *F. v. M.* Near Mount Sonder ;
lith ; Gill's Creek ; "nearly all sandhills."
stemona, *F. v. M.* Mount Harris.
etosa, *Schauer.* Laura Vale ; Gill's Creek.
amophylla, *F. v. M.* Mount Sonder.
p. Sandhills E. of Lake McDonald.

Umbelliferae.

trachycarpa, *F. v. M.* Mount Olga.
cifolius, *F. v. M.* Glen Helen ; Glen Edith ; Mount

Loranthaceae.

xocarpi, *Behr.* Near Mount Sonder.
bberulus, *Tate.* Glen Helen.
endulus, *Sieber.* Glen Edith ; Mount Conner ; W. of
&c.

Proteaceae.

rysodendron, *R. Brown.* Glen Edith.
ncifolia, *Hooker.* Horseshoe Bend ; sandhills S. of
Rennie.

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Grevillea agrifolia, *Cunningham.* Glen Farewell; Glen Edith, and all along the Macdonnell Range.
Hakea lorea, *R. Brown.* The variety with much-divided leaves. Watson Hills; Lindsay Hills.
Hakea purpurea, *Hooker.* Sandhills between Lakes Amadeus and McDonald.

Rubiaceae.

Oldenlandia galioides, *F. v. M.* West of Macdonnell Range.
Canthium latifolium, *F. v. M.*
Pomax umbellata, *Sonder.* W. end of Lake Amadeus.

Cucurbitaceae.

Melothria Maderaspatana, *Cogniaux.* Horse-shoe Bend; near Mount Sonder; Mount Olga.

Compositae.

Brachycome ciliaris, *Lessing.* Lake Amadeus.
Minuria leptophylla, *DeCandolle.* West of Eringa.
Calotis plumulifera, *F. v. M.* West of Eringa.
Calotis latiuscula, *F. v. M.* and *Tate.* Mount Olga; west of Eringa.
Aster Ferresii, *F. v. M.* Mount Olga.
Podocoma cuneifolia, *R. Brown.* Mount Sonder.
Pluchea Eyrea, *F. v. M.* Glen Helen.
Pterigeron liatroides, *Bentham.* Laura Vale.
Polycalymma Stuartii, *F. v. M.* and *Sonder.* West of Eringa.
Bidens bipinnata, *Linne.* Mount Sonder.
Centipeda orbicularis, *Loureiro.* Mount Sonder; S.E. corner of Lake McDonald.
Glossogyne tenuifolia, *Cassini.* Mount Sonder.
Angianthus strictus, *Bentham.* Near Charlotte Waters.
Gnaphalium luteo-album, *Linne.* Painta Spring.
Senecio Gregorii, *F. v. M.* Mount Sonder.
Erechthites lacerata, *F. v. M.* Glen Farewell; Basedow Range.

"Our plants agree in every respect with the one gathered by me in 1851 near Elder's Range, and described soon subsequently in the Linnaea. It seems specifically distinct from the genuine *E. arguta.* In some respects it approaches *Senecio ramosissimus* and *S. odoratus*; Drummond's plant, 328, referred by Bentham to the former species, belongs, however, to *S. leucoglossus.*" *F. v. M.*

Helichrysum Cassinianum, *Gaudichaud.* Erldunda; Eringa.
Helichrysum Lawrencella, *F. v. M.* West of Eringa.
Helichrysum semifertile, *F. v. M.* Granite rocks, N. of Ayers Range; west of Eringa.

n lucidum, *Henckel.* South shore of Lake McDonald.
Fitzgibboni,, *F. v. M.* West of Eringa.

Campanulaceae.

raea, *F. v. M.* Crown Point; Glen Edith; Mount

ia gracilis, *DeCand.* Mount Olga; Basedow Range.

Goodeniaceae.

ia striata, *F. v. M.* Leaves often flat towards the fruit about 1½ inches long, very narrow; seeds prisubic, nearly one-tenth of an inch long, brownish outmewhat fringy-papillular at the margin. Mt. Olga.
nata, *F. v. M.* Laura Vale; Warman Rocks.
andiflora, *Sims.* Dashwood Creek.
scicularis, *F. v. M.* and *Tate.* Basedow Range.
erardiana, *F. v. M.* West of Eringa.
alifolia, *R. Brown.* Mount Sonder. A variety with owèrs and verrucular-rough fruits.

Jasmineae.

ineare, *R. Brown.* Bonn Spring; Mount Sonder.
alcareum, *F. v. M.* Mount Sonder.

Asclepiadeae.

floribundum, *R. Brown.* Emily Gap; Glen Helen; n Hills.
empeana, *F. v. M.* Mount Sonder; Laura Vale; an Rocks.
Leichhardtii, *F. v. M.* Mareena Bluff.

Convolvulaceae.

uelleri, *Bentham.* Horseshoe Bend; Bonn Spring; Sonder; Glen Helen.
emigera, *F. v. M.* and *Tate.* Glen Helen.
erubescens, *Sims.* Mount Olga.
inifolius, *Linne.* Glen Helen; Mount Olga.

Solanaceae.

ocissimum, *Lindley.* Bonn Spring; Laura Vale.
urtianum, *F. v. M.* The prickly variety. West end e McDonald.
oiculatum, *Dunal.* Mount Sonder.
ipticum, *R. Brown.* A variety with narrower leaves. Sonder; Lakes McDonald and Amadeus; granite N. of Ayers Range; Mount Conner.
chhardtii, *F. v. M.* Mount Sonder.

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Nicotiana suaveolens, *Lehmann.* Mount Sonder; Glen Edith; Gill's Creek; Laura Vale.

Duboisia Hopwoodi, *F. v. M.* Glen Edith; tableland west of Eringa Station. "Shrub eight to ten feet high; foliage thick, very green and fresh-looking; fatal to camels."

Scrophularinae.

Buechnera linearis, *R. Brown.* Near Mount Sonder. Bentham already doubted the mutual specific distinctness of *B. urticifolia*, *B. linearis*, *B. tenella*, *B. grandis* and *B. ramosissima*. Recently Schumann (Flora von Kaiser Wilhelm's Land, 117) proposed to unite them under the name *B. urticifolia;* but that appellation becomes particularly misleading, when applied to the whole complex of forms, because even the typical plant, delineated by Bauer (Endl. Iconogr., 78), shows no leaves, which could be compared to those of a nettle. Far apter among R. Brown's specific designations would be that of *B. gracilis* as collective, unless the *B. Brownіana* (Schinz in den Verhandl. des Bot. Ver. v. Brandenb. xxi., 194) just described from S.W. Africa, should prove conspecific with the Australian plant, as it would seem from the notes offered, in which case the name would be very eligible also for the species, established by R. Brown. The name *Buechnera* seems first to have been correctly written by Murray in the 13th edition of Linnaeus' Syst. Veg. (1774); the genus was dedicated to the celebrated physician Andreas Elias Buechner, F.R.S., who was President of the Acad. Cæs. Leop. Carol. at Linnaeus' time, and who published among other works some on Materia Medica.

Stemodia viscosa, *Roxburgh.* A variety with narrow leaves. Mount Sonder.

Bignoniaceae.

Tecoma australis, *R. Brown.* A starved variety with minute leaves: flowers and fruits are however absent; "a creeper hanging 30 feet from the rocks." Mount Sonder; Gill's Creek.

Pedalinae.

Josephinia Eugeniae, *F. v. M.* Watson Hills.

Acanthaceae.

Justicia procumbens, *Linne.* Orraminna; Mt. Sonder; Mt. Conner; W. of Eringa.

Labiatae.

Plectranthus parviflorus, *Henckel.* Mount Sonder; Mount Olga.

Prostanthera striatiflora, *F. v. M.* Mount Sonder; Glen Edith.

Prostanthera Wilkieana, *F. v. M.* Mount Sonder; "Sandstone Rocks."

Liliaceae.

Wurmbsea dioica, *F. v. M.* Glen Edith; Gill's Creek; **Laura** Vale; Warman Rocks; Mount Olga.
Xerotes leucocephala, *R. Brown.* Sandhills, Gill's Creek; **Laura** Vale.

Commelineae.

Commelina ensifolia, *R. Brown.* Glen Helen.

Fluviales.

Potamageton sp. West of Macdonnell Range.

Eriocauleae.

Eriocaulon graphitimum, *F. v. M.* and *Tate.* W. end of Macdonnell Range.

Cyperaceae.

Cyperus difformis, *Linne.* Glen Helen.
Cyperus fulvus, *R. Brown.* Glen Helen.
Fimbristylis communis, *Kunth.* Gill's Creek.
Fimbristylis acuminata, *Vahl.* W. end of Macdonnell Range.
Fuirena glomerata, *Lamarck.* W. end of Macdonnell Range.

Gramineae.

Panicum decompositum, *R. Brown.* Glen Helen.
Andropogon bombycinus, *R. Brown.* Mt. Razorback.
Pappophorum commune, *F. v. M.* Ayers' Rock.
Sporobolus actinocladus, *F. v. M.* Glen Helen.
Danthonia bipartita, *F. v. M.* A variety with often only one fertile flower in the spikelet.
Eleusine cruciata. *Lamarck.* S. shore of Lake McDonald; Mt. Conner.
Eragrostis diandra, *R. Brown.* Glen Helen.

Rhizospermae.

Marsilea quadrivalvis, *Linne.* Mount Sonder.

Filices.

Ophioglossum vulgatum, *C. Bauhin.* Plains S.W. of Erldunda.
Cheilanthes vellea, *F. v. M.* Mount Sonder.
Cheilanthes tenuifolia, *Swartz.* Bonn Spring; Mt. Sonder; Glen Helen; Laura Vale; Mt. Leisler; Mt. Olga.
Grammitis rutæfolia, *R. Brown.* Mt. Conner.

others about as long as the seed-bearing portion of the fruit or somewhat longer. Central Australia.

This plant has also been gathered near the Finke River by the Rev. H. Kempe. The leaves are in form similiar to those of *C. cymbacantha*, while the fruits are much like those of *C. lappulacea*, but the headlets and leaves are much larger.

IPOMOEA RACEMIGERA, *F. v. M.* and *Tate.*

Imperfectly beset with short hairlets; leaves small, on rather long stalks, cordate, from the conspicuously bilobed lower portion gradually narrowed into an acute apex, without any incisions or denticles, on the surface nearly glabrous; racemes as long as the leaves or longer with several flowers; pedicels much shorter than the calyx; outer sepals almost cordate towards the base, gradually acuminated; corolla small, hardly half exserted; stamens three times shorter than the corolla; style short; ovulary glabrous. Glen Helen.

Branches slightly verrucular-rough. Leaves on the only and fragmentary specimen available, 1½ inches long. Racemes possibly in amply developed inflorescences cymously arranged. Corolla white. Fruit unknown.

This is nearest *I. chryseides*, but that plant has a cymous inflorescence, blunt sepals and a yellow corolla; the fruit of the two may also be different. In aspect the plant is also not unlike *Hewettia bicolor.*

GOODENIA FASCICULARIS, *F. v. M.* and *Tate.*

Dwarf, herbaceous, depressed, stoloniferous, almost glabrous; radical leaves linear- or cuneate-lanceolar, often somewhat indented; stem-leaves quite linear, entire, the uppermost frequently fasciculated; flowers axillary and terminal, solitary, rather small; peduncles about twice as long as the flowers, bractless; lobes of the calyx very narrow, about as long as its tube; corolla yellow, beset as well as the calyx with appressed hairlets outside, all the lobes almost equally bilobed, the two upper outward scariously appendiculated; style much shorter than the corolla, bearing hairlets at and towards the summit; stigma-cover much broader than long; fruit ovate-globular, only its summit emerging; seeds surrounded by a conspicuous membrane. Basedow Range.

Near *G. heteromera*, *G. filiformis*, and *G. O'Donnellii.*

TEUCRIUM GRANDIUSCULUM, *F. v. M.* and *Tate.*

Beset with spreading, very short, somewhat glandular hairlets; upper leaves sessile, flat, equally green on both sides, from rhomboid- to cuneate-ovate, entire towards the base, thence serrated; floral leaves similar in form, but smaller and crowded;

NOTE ON THE SOARING OF THE HAWK.

By T. W. KIRK, F.R.M.S., &c., of the Geological Survey Department of New Zealand.

[Read December 3rd, 1889.]

The peculiar notched or cut-away shape of the primary feathers in the wings of many birds, more especially of the "Raptores," or "Birds of Prey," has often attracted my attention, and the purpose of such emargination has been a source of curiosity to me for many years.

It will be observed that the outer portion of both the anterior and posterior vanes of the primary feathers of the wing (I am speaking of the feather as though it were in position in the expanded wing) are cut away—the former for about half its length, the latter for rather less. The form of these feathers has, of course, been frequently described, but I have never seen any explanation of why their shape should be as it is; indeed, I believe no such explanation has been published. I recently stumbled, so to speak, upon a discovery of what may possibly lead to a solution of the question.

When up country a short time ago I saw a large Hawk *(Circus Gouldi)* shot while soaring. After receiving the charge it continued to soar, although rapidly descending, and fell at some distance with both wings extended. On going to pick it up I was surprised to observe that, though quite dead, its wings were still expanded, and that the primaries were locked, or kept extended, by a partial reversal of their vanes—the terminal half of the posterior vane of each feather overlapping the corresponding portion of the front vane of the feather immediately behind it.

The question arose, Was this position of the feathers due to accident, or had the bird the power of placing them in this apparently unusual relationship? and if the latter, with what object?

After a careful examination I replaced the vanes in what, until more information is obtained, must be regarded as their correct position. I then extended the wing, and after a few experiments found that by manipulating the joint with the fingers, so as to give a slight rotary motion, just before full expansion was attained, the primaries could be made to take the position they occupied when first examined—that is, the locked position. This seems to prove that the bird had the power of, at will, altering the relative position of these feathers. If such a supposition can be placed beyond doubt, it will give a decided indication of the

On the Geological and Botanical Features of Southern Yorke-Peninsula, South Australia.

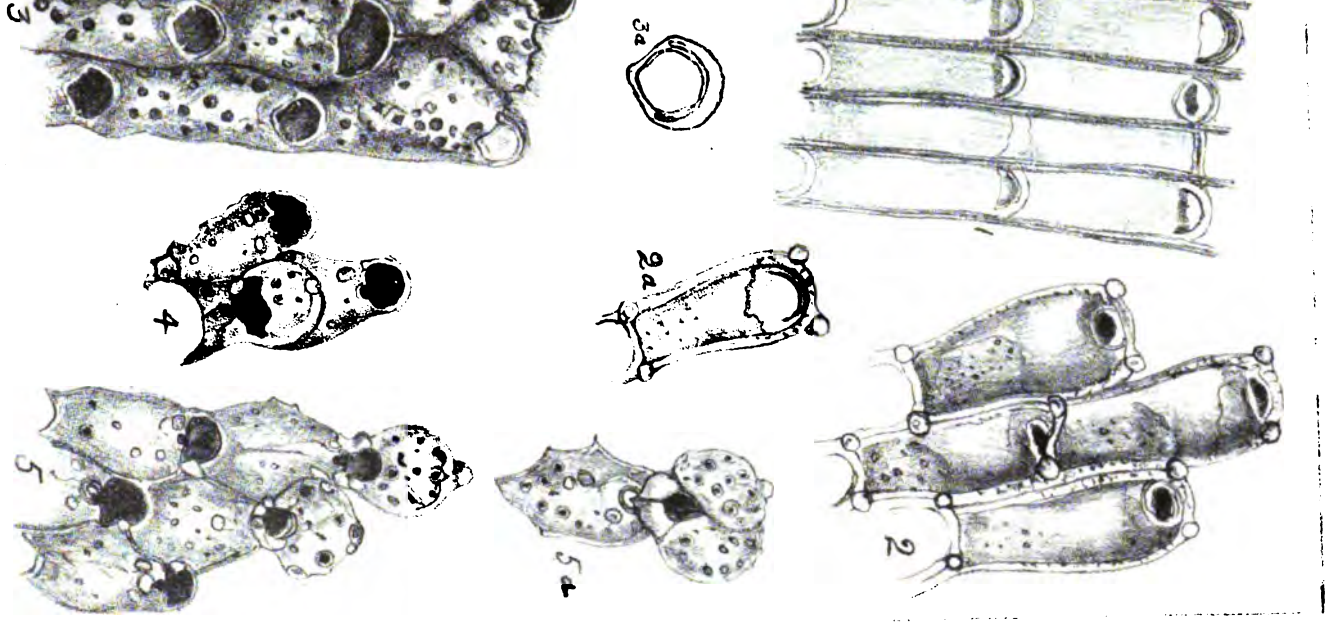
By Professor Ralph Tate, F.G.S., F.L.S.

[Read December 2nd, 1889.]

A glance at the map of Yorke-Peninsula, on which is delineated the chief physiographic features, cannot fail to suggest to the thoughtful mind that the southern portion, which has a general east and west trend, has been connected in comparative recent times only with the northern part. This is indicated by the broad belt of salt-marsh-land, which stretches across from Hardwicke Bay on the north to Sturt Bay on the south, whilst salt lagoons abound adjacent thereto, more particularly on the north side.

Standing on the high ground at Warooka and looking eastward an extensive panoramic view is spread out before you, embracing the whole of the depressed area and much beyond it; one's imagination is but little tasked to conceive that a strait once occupied the area of the existing salt-marsh, no inconsiderable portion of which is covered by water for a considerable part of the year. Indeed, it seems only necessary to remove the ramparts of blown-sand, which girdle the forementioned bays, to permit the sea once again to flow through and convert Southern Yorke-Peninsula to an island.

Long since I was impressed with this idea, which should it prove correct, I was then led naturally to anticipate certain floral peculiarities, probably having affinities with Kangaroo Island and Southern Eyre-Peninsula. The fact that this large tract of country is for the most part unsettled rendered exploration by oneself rather too serious and arduous an undertaking, and it was not till November of this year that an opportunity was presented to me, through the kind services and companionship of Mr. Matthews, of Yorketown, and Mr. Phillips, of Moorowie, of satisfying myself by personal examination of the main points of interest regarding the geology and botany of this hitherto scientifically unexplored region. The circuit of the coast-line occupied a week. The value of the results exceeded my expectations, and in the belief that my observations will be acceptable to those interested in the subject of the migration of plants and of the evidences of recent geological changes, I venture without further apology to submit them to you.



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VOL. XIII., Part II.,

DING PROCEEDINGS AND REPORTS.

ITED BY PROFESSOR RALPH TATE.

ISSUED DECEMBER, 1890.

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SKETCH OF THE GEOLOGICAL FEATURES

I. Pleistocene Deposits.

Yorke-Peninsula may be described as a saucer, the lip ituted of blown-sands, loose atop but more or less below, generally having a breadth of a half to two ttaining elevations up to 200 feet or so. Inside the nsive areas of flat marsh-lands or shallow salt-pans, of sands with much shell-debris, loose or variously in the majority of cases the top layer forms a hard ke surface of a few inches thick; less commonly these e levelled up with a natural whiting, of good quality, of at least three or four feet.

evels are varied by ridges, which seem to owe their ve-action, or they may be of the nature of sand-bars. ls in the consolidated calciferous sandstone through- le area belong to existing species.

ing has been examined for microzoa by Mr. W. G.S., but he fails to find any trace of them. I suggest terial has originated by the accumulation of exfoliated ice, washed out of the incoherent shell-banks.

of Southern Yorke-Peninsula is constituted of these deposits, except such limited areas as are now to be

II. Eocene Limestones.

iffs of Point Turton, which are about 40 feet high, l of a red polyzoal limestone, sometimes very dense ike, also exhibiting most pronounced current-bedding. n is the northern termination of a ridge, which al N.N.W. and S.S.E. trend and attains an eleva- feet or so at Warooka; by this physical feature, ferred that this limestone forms the western boundary t Salt-Marsh for a little more than half its length. w fossils observed, the Warooka ridge is an outlier ne limestones which form the sea-cliffs on the east rke-Peninsula, extending from near Black Point, by Point (Port Vincent), Stansbury, Wool Bay to Point Edithburg.

III. Archæan Rocks.

Souttar, and along the coast for a few miles to the ica-schists, occasionally gneissoid, appear in low reefs e-line. Similarly at Corney Point, the Pleistocene sed on mica-schist, intersected by narrow granite ich the felspar largely predominates. These condi- eated at Daly Head. At an unnamed point, S.W.

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from Warrenben and N. of Royston Head, gneiss appears; this is intruded by granite-veins carrying wolfram. The base of West Cape, Reef Head, Cape Spencer, south side of Rhino Head, and the coast-line between Hillock Point and Point Yorke is composed of metamorphic rock, more or less granitoid.

In all the above exposures, and these are all that are known on the coast,* the archæan rocks do not in any instance rise to more than about 20 feet above sea-level, though the Pleistocene sands are piled up upon them to heights up to 200 feet or so. Archæan rocks were brought to view in a well-sinking about three miles inland from Point Souttar, and apparently at not much above sea-level.

IV. General Remarks.

The Great Salt-Marsh is a deserted sea-way, whether by the formation of the barriers of blown-sand at its seaward boundaries, or by a moderate elevation, I cannot decide without accurate levelling, and the same uncertainty applies to the other low-level tracts in Southern Yorke-Peninsula; though it is more probable that some slight elevation of the land has taken place, so as to be in accord with the evidences of accurate levels taken on other parts of the South Australian coast-line. The whole country is devoid of water-courses, and everywhere the land rises abruptly from the shore.

The islets in Pondalowie Bay and those off Cape Spencer, and the Althorpes, are wholly or nearly so made of tabular masses of Pleistocene sandstones, from which it may be inferred that they are remnants of a more extended coast-line.

Wedge Island and the others of the Gambier Group, as also many off the Port Lincoln coast, are of the same nature; which leaves no choice but to regard them either as parts of a former land-connection between Southern Yorke-Peninsula and Eyre-Peninsula and perhaps Kangaroo Island, or that they are remnants of larger insular masses.

In pre-pleistocene times, the majority at least of the Archæan outcrops were submerged reefs or low islets constituting an archipelago of very considerable area. This condition must have been followed by elevation sufficiently great to form a beach-line commensurate with the amount of the present degraded material, the whole then became fused together by sand-drifts and a junction with Yorke-Peninsula was effected. To-day erosion has

* The Government Geologist, in his Geological Map of South Australia, 1886, shows a continuous outcrop of igneous rock from Corney Point to Point Yorke—this exaggeration may have been necessitated by the small scale of the map; the rest of the area under consideration is uniformly coloured to represent Tertiary.

n the place of accumulation, as is attested by the
f the Pleistocene-deposits, so that the Althorpes and
nt islets have come to be severed from the main

SKETCH OF THE BOTANICAL FEATURES.

erpretation of the geological record be right, then
orke-Peninsula was either a part of Southern Eyre-
d Kangaroo Island or was brought in near proximity
ension from each area during the epoch of living
. Whilst the presence of the Great Salt-Marsh may
a barrier to the migration of species of southern and
in in a northerly direction. But whatever explana-
d to account for the great floral contrasts between
ortions of the Peninsula, the botanical differences are
s to be a matter of common observation, and yet the
hydrographic conditions are absolutely the same on
f the Great Salt-Marsh.

orth side of the Great Salt-Swamp the country is a
mbered with *Casuarina quadrivalvis* and *Melaleuca*
and interspersed with small trees of *Eucalyptus*
osporum phillyræoides and *Acacia sclerophylla*, whilst
ndershrubs are *Bursaria spinosa* and *Myoporum*

exception of the Warooka Ridge, the botany of
bles that of the country on the north side, most of
e-Peninsula is covered with a dense Mallee-Scrub,
re with open glades; whilst on the exposed south-
e country is more heath-like, the shrubs being much

constituents of the Mallee-Scrub are *Eucalyptus*
uncinata, *E. santalifolia* and *E. goniocalyx* (this
ely represented by these mallees, not a single speci-
n having been observed), *Acacia anceps*, *A. calami-*
. retinodes, *Exocarpos spartea*, *Templetonia retusa*,
a, *Pimelea serpyllifolia*, *Eremophila Brownii*, &c.
he species of the scrub-lands are gregarious, both as
smaller as well as the larger shrubs.

shrub of the marsh-lands is *Melaleuca decussata*, in-
mongst which are open areas clothed with *Cladium*
the slight elevated ground around and within carries
uadrivalvis. *Melaleuca pustulata* forms dense thickets
alt lagoons.

pecies.—The total number of species observed is 235;
re unrecorded for Yorke-Peninsula, and therefore are
resumably to the Southern Section. Because of the

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great floral contrasts in the two areas, I think it desirable to furnish a full list of the species. In my Census of the Flora of South Australia (Trans. Roy. Soc., S. Aust., vol. XII., 1889), the column Y indicates the Northern Section of the Peninsula, except for a few species, which were added as the result of my recent exploration while the latter pages of the contribution were passing through the press.

The asterisk denotes the restricted species.

RANUNCULACEÆ:—*Clematis microphylla. Ranunculus parviflorus.*

DILLENIACEÆ:—*Hibbertia stricta, H. virgata, *H. Billardieri,* Hillock Point.

LAURACEÆ:—*Cassytha glabella, C. pubescens, C. melantha.*

PAPAVERACEÆ:—*Papaver aculeatum.*

CRUCIFERÆ:—*Capsella elliptica. *Lepidium foliosum;* cliffs in Pondalowie Bay.

DROSERACEÆ:—*Drosera Menziesii.*

FRANKENIACEÆ:—*Frankenia lævis.*

PITTOSPOREÆ:—*Pittosporum phillyræoides. Bursaria spinosa. Billardiera cymosa. Cheiranthera linearis.*

POLYGALEÆ:—*Comesperma volubile.*

RUTACEÆ:—*Correa speciosa. Eriostemon capitatus.*

LINEÆ:—*Linum marginale.*

ZYGOPHYLLEÆ:—*Zygophyllum fruticulosum. Nitraria Schoeberi.*

GERANIACEÆ:—*Pelargonium australe. Geranium pilosum. Oxalis corniculata.*

SAPINDACEÆ:—*Dodonæa humilis, D. stenozyga.*

STACKHOUSIEÆ:—*Stackhousia linarifolia.*

MALVACEÆ:—*Plagianthus glomeratus, *P. microphyllus,* salt marshes. *Lavatera plebeia.*

STERCULIACEÆ:—*Lasiopetalum discolor; *L. Schulzenii,* West Cape and Hillock Point.

EUPHORBIACEÆ:—*Poranthera microphylla. *Phyllanthus calycinus,* Corney Point and Hillock Point. *Beyeria opaca. Adriana quadripartita.*

CARYOPHYLLEÆ:—*Sagina apetala. Spergularia marina, S. rubra.*

ILLECEBRACEÆ:—**Scleranthus pungens,* sandy scrub-land near Pondalowie Bay.

POLYGONACEÆ:—*Rumex Brownii. Muehlenbeckia adpressa.*

CHENOPODIACEÆ:—*Atriplex paludosum, A. cinereum. Rhagodia Billardieri. Enchylæna tomentosa. Kochia oppositifolia. Salicornia arbuscula, S. australis. Salsola Kali. Suaeda maritima.*

AMARANTACEÆ:—**Polycnemon pentandrum;* saline marshes, Marion Bay. *Ptilotus spathulatus.*

URTICACEÆ:—*Parietaria debilis.*

CASUARINEÆ:—*Casuarina quadrivalvis, C. distyla.*

ŒÆ: — *Eutaxia empetrifolia. Pultenæa tenuifolia; icerosa*, heath-lands, S.W. coast. **Templetonia retusa. ia medicaginea. Lotus australis. Kennedya mono- a, K. prostrata. Acacia spinescens; *A. rupicola, alamifolia, *A. anceps* and *A. retinodes*, very common gregarious; *A. microcarpa, A. brachybotrya, A. sclero- a, A. salicina, A. longifolia.*

E:—**Pimelea flava, P. glauca, P. serpyllifolia;* common ath land.

CEÆ:—*Tillæa verticillaris.*

—*Acæna ovina.*

:—*Mesembrianthemum æquilaterale, M. australe. Tetra- implexicoma.*

:—**Epilobium glabellum.*

E: — *Calycothrix tetragona.* **Melaleuca decussata,* nes and wet heath-lands, common; *M. parviflora, nninata, M. pustulata. Eucalyptus odorata, E. oleosa, oniocalyx, E. uncinata, *E. santalifolia.*

ÆÆ:—*Pomaderris racemosa, P. obcordata. Cryptandra ifera.*

EÆ:—*Santalum acuminatum, S. persicarium. Chore- glomeratum. Exocarpos cupressiformis, E. spartea, hylla.*

LÆ:—*Haloragis aspera.*

ERÆ:—*Apium prostratum. Daucus brachiatus.*

CEÆ:—*Loranthus pendulus.*

:—*Opercularia varia*, Hillock Point. *Asperula oli- a. Galium umbrosum, G. australe.*

E:—*Aster axillaris, A. lepidophyllus, A. exul, A. Huegelii. dinia australis. Minuria leptophylla. *Brachycome leri*, widely spread; *B. exilis. *Toxanthus Muelleri. tia tenuifolia. Erechthites hispidula. Senecio lautus. la filifolia*, salt-marshes, Marion Bay. *Stuartina leri. *Ixodia achilleoides*, West Cape, Cape Spencer. perma angustifolium. *Ixiolæna supina*, cliffs in alowie Bay. *Athrixia tenella. Cassinia spectabilis. lepis canescens, P. rugata. Gnaphalium luteo-album, aponicum, G. indutum. Leptorrhynchos squamatus, aitzia. Helipterum hyalospermum. Helichrysum lucidum, tusifolium*, var. *tephrodes, H. leucopsidium, H. apicu- , H. retusum. *Angianthus pleuropappus*, marsh-lands; mentosus. Skirrophorus strictus, *S. Preissianus*, salt- hes. *Calocephalus Brownii, Microseris Forsteri.*

LACEÆ:—**Isotoma scapigera*, marsh-lands, Corney Point, about the Great Salt-Swamp. *Wahlenbergia gracilis.*

CEÆ:—*Velleya paradoxa. Scævola crassifolia, *S. micro-*

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carpa, not uncommon; *S. linearis. Goodenia ovata, G. varia, G. geniculata, G. pinnatifida.*

PRIMULACEÆ:—*Samolus repens.*

CONVOLVULACEÆ:—*Convolvulus erubescens.* **Dichondra repens*, swampy ground, Daly Head. *Wilsonia humilis.*

BORAGINEÆ:—*Eritrichium Australasicum. Myosotis australis. Cynoglossum suaveolens.*

APOCYNEÆ:—*Alyxia buxifolia.*

GENTIANEÆ:—*Sebæa ovata;* **S. albidiflora*, natural pasture-land, Marion Bay. *Erythræa spicata.*

PLANTAGINEÆ:—*Plantago varia.*

LOGANIACEÆ:—**Mitrasacme paradoxa*, wet places, Marion Bay; **Loyania crassifolia, L. ovata, L. linifolia.*

SOLANACEÆ:—*Solanum simile. Lycium australe. Nicotiana suaveolens.*

EPACRIDEÆ:—*Styphelia Richei, S. patula, S. ovalifolia.*

LABIATÆ:—*Teucrium sessiliflorum, Westringia rigida, Prostanthera chlorantha.*

OROBANCHEÆ:—*Orobanche Australiana.*

SCROPHULARINEÆ:—**Limosella aquatica. Euphrasia Brownii.* **Veronica distans*, heath-lands, common.

MYOPORINEÆ:—*Myoporum insulare, M. viscosum, M. humile. Eremophila Brownii.*

CONIFERÆ:—*Callitris verrucosa.*

ORCHIDEÆ:—*Thelymitra longifolia. Prasophyllum fuscum, P. patens. Microtis porrifolia.*

LILIACEÆ:—*Xerotes dura, X. effusa. Dianella revoluta. Bulbine semibarbata. Thysanotus Baueri.* **Tricoryne elatior*, very common. *Chamæscilla corymbosa.*

JUNCACEÆ:—*Juncus communis.*

FLUVIALES:—*Triglochin centrocarpa.* **Ruppia maritima.*

RESTIACEÆ:—**Leptocarpus Brownii*, Melaleuca-scrub at Stone Hut, Marion Bay.

CYPERACEÆ:—**Schœnus nitens*, Stone Hut. **Isolepis riparius*, Stone Hut; *I. nodosus.* **Cladium filum*, subsaline swamps; **C. junceum*, Stone Hut; *C. lanigerum, C. deustum. Lepidosperma gladiatum, L. viscidum.*

GRAMINEÆ:—*Spinifex hirsutus. Lepturus incurvatus. Stipa elegantissima,* **S. teretifolia*, rocks by the sea; *S. aristiglumis, S. scabra. Dichelachne crinita. Agrostis Solandri. Sporobolus Virginicus. Danthonia penicillata. Agropyron scabrum. Distichlis maritima. Triodia irritans. Poa cæspitosa, P. lepida.*

FILICES:—*Cheilanthes tenuifolia.*

s of the plants of Yorke-Peninsula is, at present, as

ction :—Total species, 421. Restricted species, 230.
ction :— " " 232. " " 41.

Species in common, 191.

ity of the restricted species in the Southern section
e flora characteristic of much of the west and mid-
he southern coast of Australia, as indeed the whole
is complexion, which is in no small measure due to
in sea-coast-species. So far as South Australia is
ne florula of South Yorke-Peninsula has a strong
to that of Kangaroo Island and South Eyre-Penin-
species constituting this common facies the following
hy :—

	Kangaroo Id.	S. Eyre-Peninsula.
llardieri	*	
iosum	*	
Schulzenii	*	*
pentandrum	*	
retusa	*	*
rosa...	*	*
aginea	*	*
s		*
ola	*	*
des	*	*
cussata	*	*
antalifolia	*	*
oniocalyx	*	
oides	*	*
na	*	*
tabilis	*	
uelleri	*	*
leuropappus		*
Preissianus	*	*
btusifolium, *var.* tephrodes	*	*
igera		*
ifolia	*	*
ans	*	*
Brownii		*
ns	*	*
lia	*	*

onnection, I may add that a land-snail, *Bulimus*
ich has been known only from Port Lincoln to
all over South Yorke-Peninsula. Though the facies
a recalls those of Kangaroo Island and the Port

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Lincoln District, yet it is wanting in several of their salient forms, such as species of *Grevillea*, *Cryptandra*, *Xanthorrhœa*,* various genera of *Myrtaceæ*, *Eucalyptus corynocalyx*, &c.

Much of Southern Yorke-Peninsula is virgin-country, and though sheep have been run all over it in past years, yet it is fairly free from alien plant-species. The extra-Australasian species number 31, or about 13·5 per cent. of the total species, the same as for Kangaroo Island; all the species occur in Kangaroo Island and at Port Lincoln. Some very wide-spread species have not yet been observed, such as:—*Hypericum Japonicum*, *Stellaria glauca*, *Lepidium ruderale*, *Solanum nigrum*, *Lythrum hyssopfolia*, *Luzula campestris*, *Juncus bufonius*, *Anthistiria ciliata* and *Ophioglossum vulgatum*.

The only species whose presence is difficult to account for in the present state of our knowledge of its distribution is *Sebæa albidiflora*, as its western limit was thought to be the Mount Gambier District, where I found it in 1881.

Acacia anceps is peculiar to the Port Lincoln district, and must be very local, as I have not seen it in life there; in S. Yorke-Peninsula it is widely spread.

Isotoma scapigera extends from King George Sound to Fowler Bay and Streaky Bay, and reaches its eastern limit in S. Yorke-Peninsula.

Callitris verrucosa in a varietal form occurs only between West Cape and Cape Spencer. It is of a regular pyramidal form, attaining to a height of about ten feet, fruiting, however, at eighteen inches to two feet. The cones are slightly under half-inch diameter, quite smooth and racemosely clustered in groups up to five and six; the foliage is a bright green.

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* An arborescent grass-tree is reported to occur five or six miles north of Yorketown; but specimens have not yet reached me; it is an addition to District Y. Dr. James has forwarded me *Thryptomene Miqueliana*, gathered by him in the scrub six miles from Moonta; this is the first definite locality in S. Australia for it, the only record being "Spencer's Gulf," on the authority of Warburton. *Cassia Sturtii* is another addition by the same collector.

R NOTES ON AUSTRALIAN COLEOPTERA, DESCRIPTIONS OF NEW GENERA AND IES.

By the Rev. T. BLACKBURN, B.A.

[Read October 7, 1890.]

VIII.

NITIDULIDÆ.

CRYPTARCHA.

loss to understand why *C. flavipennis* and *flavogut-*r, are included by Mr. Masters in his Catalogue of insects. The author of those species gives their India, or."

COLYDIIDÆ.

MINTHEA.

fore me several specimens of an insect which has re- found in the South Australian Museum in the wood riosities. It is evidently a member of this genus, ounded on a South American species, and which has eported from New Guinea and the Malayan Archi- appears to be very close to *M. similata*, Pasc., so close I do not think it well to give it a new name (espe- I consider the probability of its not being an indigen- lian insect). I should judge, however, that it is a narrower and more elongate insect, from its differing the figure of *M. squamigera*, Pasc., to which Mr. *M. similata* "exceedingly like," without mentioning ce of shape; moreover, Mr. Pascoe says that the f *M. similata* is anteriorly "somewhat broader than whereas in the examples before me I do not think that any narrower than the front of the prothorax; but find any other distinction, and the shape of *M. similata* lly stated, but only arrived at by inference, and the pancy in the width of the head may be a mere trifling servation, or even a sexual character, it is quite his may be *M. similata*.

CUCUJIDÆ.

LÆMOPHLŒUS.

s, Schönh. I have received examples of this appa- opolitan insect (which I cannot ascertain to have been

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previously recorded by name as Australian) taken in produce that was probably imported. I suspect, however, that this is in reality the insect which figures in Masters' "Catalogue" as *L. testaceus*, Fab. According to Dr. Erichson (Ins. Deutsch. III., pp. 320 and 321) the species which Fabricius described as *Cucujus testaceus* is a *Læmophlæus* (occurring under the bark of trees in Germany), quite distinct from the cosmopolitan *Cucujus pusillus* of Schönherr, which lives on rice and other dry produce; but the latter was mistaken for the former by Stephens (Illust. Br. Ent. Maud. IV., p. 224), where it figures erroneously as *C. testaceus*, Fab. Dr. Erichson is confirmed in his statement by De Marseul in his Catalogue of European *Coleoptera*, and also by Gemminger and Harold. The insect now before me should, therefore, stand thus in our catalogue—

LÆMOPHLŒUS (CUCUJUS) PUSILLUS, *Schön.*
L. (Cucujus) testaceus, Steph. (nec Fabr.).

I have not been able to ascertain on what authority *L. testaceus*, Fabr., is placed in Masters' Catalogue, and therefore I am, of course, unable to state positively that the German insect has not been found in Australia, but I should think it very improbable.

CLERIDÆ.

NATALIS.

N. hirta, sp. nov. Angusta; subcylindrica; pilis sat longis erectis dense vestita; ferruginea; oculis fortiter convexis, minoribus; elytris antice minus fortiter (postice gradatim subtilius) cancellato-punctulatis, interstitiis antice latis planatis alternis mox pone basin gradatim angustioribus carinatis. Long., 9 l.; lat. $2\frac{1}{5}$ l.

A narrow convex species thickly clothed with erect hairs over the whole upper surface and the legs. The elytra are very peculiarly sculptured. The punctures in the rows are much smaller than in *N. porcata*, Fab., the interstices between the rows of punctures being even at the base quite as wide as the individual punctures in the rows; at the extreme base all the interstices (though flat) are a little raised, but at a very short distance behind the base the alternate interstices disappear altogether (or—more exactly—cease to be in the least degree elevated) while the others become narrower and more cariniform; in the apical half the sculpture of each elytron consists of four costæ (exclusive of the suture and the lateral margins), close to which on either side is a row of square punctures—the space between the first and second rows being perfectly flat, and not in the least elevated, that between the second and third strongly costate, and so on. The head and prothorax are very similar to those of *N. semicostata*, Blackb. (the latter being evidently wider, and more dilated later-

ıd the middle than in *N. porcata*), but the antennal club differ notably from that of *N. porcata*. The ventral seg- the example before me) are nitid throughout, and have a ystem of puncturation (except on the broad riband-like ch forms the apical portion of the anterior four segments) of a very fine, even, close puncturation, among which rser and somewhat squamose punctures are rather evenly losely mingled. The apical margin of the fifth ventral s very feebly bisinuate. The femora do not differ notice- ı those of *N. porcata;* the anterior and intermediate arched, the hind tibiæ straight.
stralia; Israelite Bay (Mr. French).

ornis, sp. nov. Elongata; sat plana; minus pubescens; iginea, antennis (clava excepta) capite prothorace, et ore subtus obscurioribus; oculis sat magnis minus con- ; antennarum articulo ultimo intus apice spina valida ucto, articulis penultimis fortiter transversis; protho- subcylindrico obsolete punctulato ad latera parum loso, quam latiori vix longiori; elytris apice mucronatis, issime cancellato-punctulatis, puncturis apicem versus etescentibus, interstitiis plerisque postice carinatis; ribus posticis gracilibus, valde elongatis. Long., $9\frac{1}{2}$— .; lat., $2\frac{1}{2}$—$3\frac{1}{5}$ l.

remarkable species, and very distinct from all previously The elytra gradually and gently increase in width base hindward to about the middle, and then dilate ddenly to half again the width of their base. In the ples before me (probably of the same sex) the ventral are somewhat closely and by no means finely squamose- e, with some much finer puncturation intermingled, the ion being finer, closer, and less squamose about the nd especially near the apex) of the intermediate three The apical margin of the fifth ventral segment is sub- and scarcely bisinuate. The front and intermediate moderately arched, the hind tibiæ straight. Of the terstices all except the first and fifth are more or less ehind. The interstices are near the base very much than the individual punctures in the rows.
ralia; near Adelaide.

is, sp. nov. Elongata; minus convexa; minus pubes- ; piceo-nigra, capillis aureis hic illic (præsertim in rum anticorum parte inferiori, in tibiarum apice intus, tarsis subtus) conspicue ornata; oculis sat magnis ce convexis; antennarum articulo ultimo subferrugineo ato apice oblique subtruncato, 10° manifeste (9° nullo

modo) transverso; prothorace quam longiori parum latiori, subcylindrico, obscure punctulato, ad latera minus ruguloso; elytris crassissime cancellato-punctulatis, puncturis in tertia partia apicali subobsoletis, interstitiis alternis postice fortiter carinatis; femoribus posticis sat gracilibus sat elongatis. Long., 12 l.; lat., 3⅜ l.

This species cannot be far removed from the preceding one, which it resembles in the prothorax being only a little tumid laterally behind the middle, and in the hind femora being more slender and elongate (though not nearly so much in this species) than in *N. porcata* and others. The elytra are sculptured almost exactly as in *N. semicostata*, Blackb., but are very much less dilated behind the middle than in that species (which moreover has much shorter hind femora and straight intermediate tibiæ, smaller and more prominent eyes, shorter tarsi, &c.). In the example before me the longitudinal channel on the prothorax is very short indeed, but (judging from other species) it is probably variable. The ventral segments are very like those of *N. semicostata*, the middle of the second and third being opaque through the presence of very close minute puncturation (in this species, however, not pubescent, as in *semicostata*), and the apex of the fifth being distinctly bisinuate. The front and middle tibiæ are strongly curved, the hind tibiæ straight.

McDonnell Ranges, Central Australia; taken by Mr. A. S. Wild.

N. constricta, sp. nov. Minus angusta; parum convexa; pilis sat longis erectis dense vestita; elytris ad basin quam prothorax sat angustioribus postice fortiter dilatatis; ferruginea; capite, prothorace, femorum parte media, sternis, et abdominis lateribus plus minus infuscatis; elytris postice rotundatis, puncturis quadratis sat magnis seriatim instructis, interstitiis alternis sat fortiter elevatis. Long., 6 l.; lat., 2 l

The head and prothorax are closely covered with fine puncturation with more sparse and much coarser punctures intermingled, the sides of the latter not very coarsely rugulose; the sculpture of the prothorax is in all respects very similar to that of *N. porcata*, Fab., but the segment is shorter, its length and width being equal. The extreme narrowness of the elytra at the base (where they are only about seven-tenths of their width near the apex and are decidedly narrower than the prothorax) at once separates this little species from its described congeners. The front and intermediate tibiæ are strongly arched.

Central Australia.

N. inconspicua, sp. nov. Elongata; sat convexa; postice parum dilatata; pilis longis erectis dense vestita; ferruginea,

othorace sternisque plus minus infuscatis; elytris undatis, puncturis quadratis seriatim instructis s vix elevatis. Long., 5⅓—6 l.; lat., 1⅔—1⅔ l.

re of the head is close and confused, consisting of ll punctures and numerous stria-like wrinkles much r; that of the prothorax (which is distinctly longer almost as in *N. porcata* but much less rugulose on e rows of punctures on the elytra are almost as in he interstices between the rows of punctures are e alternate interstices however from some points of g not quite so flat as the rest.

losely set, erect hairs clothing the whole surface ill at once distinguish this species from nearly all ongeners. It differs from *N. hirta* by the absence næ and from *constricta* by the elytra much wider orax, the prothorax longer than wide, &c., &c.

; I do not know the exact habitat.

p. nov. Sat elongata; minus convexa; minus ; ferruginea vel ferrugineo-picea elytris mox post obscure pallide fasciatis, oculis sat magnis modice antennarum articulo ultimo sat elongato apice uminato, 10° manifeste (9° vix evidenter) trans-rothorace quam longiori haud latiori, subfortiter ebre duplo-punctulato, lateribus pone medium sat rotundato-ampliatis, parte ampliata crassissime elytris crasse cancellato-punctulatis, puncturis bsoletescentibus, interstitiis alternis postice plus inatis; femoribus posticis minus gracilibus minus Long., 8—10½ l.; lat. 2½—3⅕ l.

is near *N. porcata*, Fab., from which it differs *inter* ong lateral dilatation of the prothorax behind the much greater prominence of the alternate inter-ytra as compared with the other interstices in the n the presence of a distinctly apparent (though a pallid colour running across the elytra immedi-he middle, and in the puncturation of the ventral ch is of two different systems, one consisting of fine s, the other of rather closely packed strong squamose uch as in *N. hirta*. The puncturation on the pro-nsists of fine and coarser punctures intermingled, be noted that this puncturation is much less close han on the prothorax of *N. cribricollis*, Spin. In mples before me the fifth ventral segment is quite st semi-circularly, emarginate all across its apical ne other example this segment is sub-bisinuately

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truncate (the bisinuation scarcely indicated). The front and intermediate tibiæ are strongly bent.

N.B.—A third example—apparently immature—is entirely of a pale testaceous colour with the fascia scarcely indicated on the elytra.

S. Australia; near Port Lincoln.

N. longicollis, sp. nov. Elongata; minus convexa; capillis longis dispersis vestita; ferruginea; oculis sat magnis sat convexis; antennarum gracilium articulo ultimo sat elongato apice obtuse acuminato, 10° manifeste (9° vix evidenter) transverso; prothorace quam latiori sat longiori, subfortiter minus crebre duplo-punctulato, lateribus pone medium modice rotundato-ampliatis, parte ampliata sat crasse rugulosa; elytris crasse cancellato-punctulatis, puncturis postice minoribus, interstitiis alternis postice leviter carinatis; femoribus posticis sat gracilibus sat elongatis. Long., 6¾ l.; lat., 1⅛ l.

Resembles *N. fasciata* but with unicolorous elytra, antennæ much more slender, prothorax decidedly longer than broad and less dilated laterally behind the middle (in the example before me the longitudinal channel on this segment is placed in a large deep depression), the hind femora much longer and more slender, &c. From *N. cribricollis*, Spin. (of which Dr. Sharp kindly identified an example for me), this species differs by its much less closely punctured prothorax. The general puncturation of the ventral segments is sparse squamose and rather coarse; but the middle of the third and fourth of these segments is occupied by very strong, rather fine, and very closely packed punctures. The apical margin of the fifth ventral segment is truncate.

S. Australia; near Adelaide.

SYNOPSIS OF SPECIES.

A. Species of moderate size or small (not more than about an inch long).
  B. Apex of elytra not mucronate.
    C. Body above and legs not clothed with long close erect pilosity*
      D. Disc of prothorax not closely and evenly punctured.
        E. Intermediate tibiæ bent.
          F. Sides of prothorax very strongly vermiculate rugulose.
            G. Alternate interstices of the elytra much more costate than the rest.
              H. Prothorax gently transverse. *lugubris*, Blackb.
              HH. Prothorax not wider than long. *fasciata*, Blackb.

GG. Alternate interstices of elytra not or scarcely more elevated than the rest. *porcata*, Fab.

FF. Sides of prothorax much less rugulose than in *N. porcata, fasciata*, &c. *longicollis*, Blackb.

EE. Intermediate tibiæ straight. *semicostata*, Blackb.

DD. Disc of prothorax closely and evenly punctured. *cribricollis*, Spin.

CC. Body above and legs clothed with close, erect, long pilosity.*

D. Elytra wider at base than the prothorax.

E. Elytra with strong widely separated carinæ behind the middle. *hirta*, Blackb.

EE. Elytra with no distinctly cariniform interstices. *inconspicua*, Blackb.

DD. Elytra narrower at base than the prothorax. *constricta*, Blackb.

Apex of elytra mucronate. *spinicornis*, Blackb.

ecies of great size. *Titana*, Thoms.

—Besides the above there is Sir W. Macleay's *N. Mastersi* Queensland), the description of which is not complete to enable me to place it in the tabulation. It seems, , to be near my *fasciata*, but to have unicolorous elytra prothorax "much longer than wide."

CISSIDÆ.

CIS.

ualis, Blackb. I accidentally omitted to add to my des- of this species (Trans., 1887, p. 268) the mention of the ; the insect is found in hard fungi on trees near Port

LONGICORNES.

ENNEAPHYLLUS.

, sp. nov. ♂ Minus elongatus, postice leviter angustatus; nitidus; ferrugineus, mandibulis nigris, antennarum artis basalibus et prothoracis lateribus picescentibus; elytris se punctulatis, obscure subcostatis; antennis corpore sat gioribus, articulis 3-10 ramas singulas minus elongatas ttentibus; segmento ventrali 5° apice arcuatim emarato; oculis supra minus approximatis; corpore subtus idiori. Long., 13 l.; lat., 4⅓ l.

*species of the genus have a clothing of short semi-recumbent hairs with a few long and erect, but this is quite different from the long ity of the species included under "CC."

Resembles *E. æneipennis*, Waterh.; compared with that species the general form is less elongate, and the elytra are more narrowed hindward. The elytra are much more coarsely punctulate, and the lamelliform processes of the antennal joints are much shorter, that of the third joint being scarcely longer than the fourth joint, those of the following joints increasing a little, but not one of them exceeding double the length of the joint from which it is given off.

Victoria; in the mountainous districts near Tarwin River in South Gippsland. Sent to me by Mr. C. French, and named (at his wish) in honor of the captor, Mr. Ross.

CERAMBYX PULLUS, *Newm.*

I believe this name to have crept into Masters' "Catalogue of Australian Coleoptera" by an oversight. Newman states that it is from New Zealand.

PACHYDISSUS.

P. boops, sp. nov. Nigro-piceus; sat dense griseo-sericeo pubescens; prothorace ad latera obtuse tuberculato, supra crasse rugato; elytris apice emarginatis, incisuræ angulis productis spiniformibus; subtus oculis sat approximatis, spatio inter oculos fortiter sat æqualiter punctulato vix leviter impresso haud transversim sulcato.

Maris antennis corpore paullo brevioribus; articulo 1° turbinato prothoracem nullo modo attingenti; 2° perbrevi fortiter transverso; 3° quam 1^us^ vix breviori, fortiter turbinato, qnam latiori sat longiori; 4° quam 3^us^ manifeste nec multo breviori, vix angustiori, turbinato, quam latiori parum longiori; 5° 3° longitudine æquali, hoc sat angustiori, leviter turbinato; 6° multo angustiori, vix turbinato, quam 1^us^ parum longiori: ceteris simplicibus; segmento ventrali apicali postice bisinuato.

Feminæ (? hujus speciei) antennis usque ad segmentum ventralem 3^um^ haud plane attingentibus, haud dilatatis; segmento ventrali apicali postice rotundato. Long., 14—15 l.; lat., 4—5 l.

The species of this genus are very difficult to separate *inter se* owing to the sculpture and pubescence of their upper surface being very uniform. The present species is very like *P. sericus*, Newm., from which it differs by the antennæ of the male having their dilated joints more strongly swollen and differently proportioned, and notably by the structure of the head, which appears to me to furnish the best specific characters in this genus. The eyes are a trifle more approximate above than in *P. sericus*, the interval between them being distinctly less wide in the male than the

of the shortest line that can be drawn across the eye at its est point (behind the antennæ). On the underside the e much more approximate than in *P. sericus*. If the insect ned upside down, so that the undersurface of the head is down upon, the width of the interval between the eyes is ly less than the width of the visible portion of either eye. rtion of the head between the eyes (on the undersurface) is and somewhat closely and strongly punctulate, and bears ow impression near its front. In *P. sericus* the portion n the eyes of the undersurface of the head is distinctly han the width of the visible portion of either eye (similarly down upon), is not distinctly punctured, and bears an ex- deep transverse sulcus. The presence of this sulcus makes nt and hind margins of the same appear as two strong costæ, so that from a certain point of view (looking from obliquely along the undersurface of the head) these two front margin of the submentum appear to be three strong nitid ridges (almost like knife-edges). There is no such nce on the undersurface of *P. boops*.
h Australia; basin of Lake Eyre.

ei, sp. nov. Nigro-piceus; sat dense griseo-sericeo bescens; prothorace ad latera obtuse tuberculato, supra sse rugato; elytris apice truncato-emarginatis, incisuræ gulis vix acutis; subtus oculis valde separatis, spatio inter los crasse sparsim obscure punctulato transversim mani- te concavo.

ntennis corpore multo brevioribus, præter modum dilatatis; iculo 1° ovato quam latiori parum longiori, 2° perbrevi am longiori quater latiori, 3° 6° singulis 1° longitudine æqualibus, 3° 4° que fortiter transversis, 5° paullo angus- ri vix transverso, 6° quam 5^us^ sat angustiori quam latiori llo longiori, 7° paullo longiori minus incrassato; ceteris plicibus, segmento ventrali apicali postice leviter bisinuato. tet.

is one of the most remarkable *Longicorns* known to me, to the extraordinary shape and thickness of the antennæ uale, which remind one of the horns of an ibex. At their part they are scarcely narrower (placed side by side) than thorax. The interval between the eyes on the upper- is considerably wider than the length of the shortest line uld be drawn across the eye behind the antennæ. The between the eyes on the undersurface is extremely wide, narrower than the widest part of the buccal cavity. In his piece of the undersurface of the head is not unlike that *ricus*, Newm., but is wider and much less strongly sulcate

transversely. Its front edge is nitid and somewhat prominent, so that viewed from a point similar to that from which the undersurface of the head in *P. sericus* presents three transverse nitid ridges, the front of the submentum and of the piece between the eyes appear as two nitid ridges (the hindmost one of *P. sericus* appearing to be wanting). The feeble emargination of the apex of the elytra and the non-spiniform extremities of the same are also distinctive. From *P. boops* this insect is at once distinguished *inter alia* by the much wider separation of its eyes both above and beneath, and by its wonderful antennæ.

I have named this species after Prof. Tate, who has proved the singular versatility of his abilities in Natural History by discovering this and others of our most interesting Australian *Coleoptera*, in spite of his having treated the *Coleoptera* as quite a subordinate object of study.

South Australia; near Eucla.

N.B.—I have before me examples of all the described Australian species of this genus. *P. Australasiae*, Hope, is distinguished *inter alia* by the antennæ of the male being much longer than the body; the structure of the head and eyes is almost as in *P. boops*. *P. picipennis*, Germ., has the antennæ of the male a little longer than the body, and the head and eyes very similar to those of *P. Tatei*, although on the undersurface the front margin of the piece between the eyes is much less prominent in an upward direction. *P. nubilus*, Pasc., has antennæ more feebly dilated in the male than in *P. sericus*, the structure of the head resembling that of *P. boops*, but with the eyes separated a little more widely above and much more widely beneath.

DIDYMOCANTHA.

D. nigra, sp. nov. ♀ (?) Elongata; nitida; nigra; femoribus basi rufis; antennis obscure rufis (articulis 1° omnino, 3° et sequentibus apicem versus, picescentibus); his corpore paullo minus dimidio brevioribus, nitidis, setis subtilibus elongatis sparsim vestitis, articulo 1° sat incrassato fortiter (ceteris subtiliter) punctulato quam 7^us^ vix longiori, 2° minuto, 3° omnium longissimo, 4° quam 3^us^ parum breviori, ceteris gradatim parum brevioribus, articulis 4-10 leviter compressis apice intus sat productis nec spinosis; prothorace quam longiori fere duplo latiori, crebre fortiter confluenter rugulose punctulato, in medio longitudinaliter irregulariter lævi, pilis sat brevibus erectis sparsim vestito, nec tuberculato nec spinoso, lateribus minus arcuatis mox pone apicem et ante basin constrictis; elytris fortiter sat crebre vix rugulose punctulatis singulis leviter bicostatis apice rotundatis; pedibus modicis sparsim setosis, femoribus posticis abdominis longitudinem mediam vix

tibus; oculis magnis reniformibus fortiter granulatis
ubapproximatis, subtus distantibus; palpis maxil-
abialibus sat longioribus. Long., 11 l.; lat., 3 l.

lar lævigate central line of the prothorax widens out
he middle into a somewhat quadrate space which is
ated above the general surface. The shape of the
a little difficult to describe; this segment is almost
at the base and apex, but immediately behind the
front of the base it suddenly dilates, the sides of this
being scarcely rounded, but diverging slightly hind-
sculpture of the prothorax and the somewhat elongate
with the 4th) third joint of the antennæ are perhaps
tent with a place in *Didymocantha*, but I do not find
consistent characters.
V. Australia; sent to me by C. French, Esq.

DEMONASSA MACLEAYI, *Pasc.*

hardly be a doubt that this is identical with *Lamia*
ewm.; as the latter is the older name the synonomy
us:—

dichotoma, Newm. Zool. App., 1851, p. 179 [*Lamia*
].
i, Pasc. Trans. Ent. Soc., 1859., p. 32 *(Zygocera)*.
ia, Thoms. Syst. Ceramb., 1864, p. 328.

SYMPHYLETES.

sp. nov. Obscure ferrugineus, pube grisea umbrina
caque vestitus; prothorace antice angustato, supra
ulato; elytris sat elongatis, distincte punctulatis,
emarginatis dense hirsutis, parte antica fere dimidia
im latera versus) sparsim sat fortiter granulatis.
l.; lat., $2\frac{2}{5}$ l.

s of a dull ferruginous, or neutral, tint, becoming a
r in the hinder half of the elytra and on the under-
brum is almost testaceous. The vestiture of the face
dense mixture of rather long fulvous and grey pubes-
ne top of the head and on the prothorax the pubes-
-brown, mottled with orange. On the elytra a com-
ar space (limited by the base and a line from each
point on the suture situated at a distance from the
a little more than a quarter of the length of the
colorous with the prothorax, or even a little darker;
behind this, on each elytron, another space (inde-
gular, limited behind by a line running from the
apex of the dark basal common triangle to the lateral

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margin a little in front of its middle) is clothed with pale-grey pubescence very conspicuously mottled with orange; the remainder of the elytra is clothed with ferruginous pubescence obscurely marked with greyish patches and numerous small but conspicuous and well-defined orange spots. On each elytron there are about 20 shining black pointed granules of moderate size placed almost entirely on the pale triangular patch, and running somewhat irregularly in about five longitudinal rows. The prothorax is about one-third again as wide as long, widest at the base, and narrowed to the front, the sides not toothed, and almost straight. The undersurface is clothed with whitish pubescence, the sides of the metasternum, the hinder part of each ventral segment, and various small spots being orange. The pubescence of the legs is for the most part brownish or fulvous, but it is whitish-grey on the undersurface of the femora. My example is a male; its anterior coxæ are not spined; its second ventral segment has on either side a large patch of dense silky pubescence (of pale-brown colour) as in *pubiventris*, Pasc. The antennæ are scarcely longer than the whole body; they are clothed with ferruginous pubescence, the extreme base and undersurface of the joints whitish, the undersurface with a close-set fringe of long pale-brown hair.

South Australia; Port Lincoln district.

PLATYOMOPSIS.

P. Frenchi, sp. nov. Picescens; pube cinerea et fumicolori dense vestita; prothorace tuberculis circiter 8 vix pone medium serie transversali positis; elytris apice truncatis, tuberculis numerosis (longitudinaliter seriatim dispositis) instructis, his pone partem basalem apicem versus gradatim minoribus, pube fumicolori humeros apicemque versus disposita et maculam subrotundam fere nigram in medio marginis lateralis formanti. Long., 7 l.; lat., $2\frac{4}{5}$ l.

The close-set pubescence covers the whole surface so densely that the derm (excepting the nitid tubercles) is entirely concealed. The general colour is ashy white, with a slightly ferruginous tone on the head and sterna. The appearance of markings caused by the presence of smoky-coloured pubescence takes the form of an ill-defined patch on the shoulder, a large well-defined spot on each side at about half the length of the elytra (round about which the whitish pubescence is at its whitest), and a large obscure apical patch, the front margin of which slopes away hindward on either side from the suture just behind its middle, reaching the lateral margin at a distance from the apex of about a third of its whole length. The row of eight small tubercles (of which the middle two are the largest, they only projecting above the pubescence), placed in a sinuous line, with its ends near the front

in of the prothorax on either side, and its middle at about entre of that segment, together with the disposition of the l tubercles, will distinguish this species from its described ners. The elytral tubercles are smaller than in the allied s. In the hinder third part of the elytra they do not rise the pubescence; they run in six or seven fairly regular udinal lines on each elytron (the first, third, and fifth rows ining the largest tubercles), and in each row no tubercles d the front quarter of the elytra are nearly so large as some ose on the front quarter. The straight truncation (with its nal limit not at all spiniform) of the apex of the elytra also to be a good character.

garn, W. Australia; sent to me by C. French, Esq.

PHYTOPHAGA.

POLYOPTILUS.

believe *P. Lacordairei*, Germ., and *P. Erichsoni*, Germ., to e male and female respectively of one species. My reasons inking so are that the two always seem to occur in company, hat all the examples I have dissected of the former are and of the latter females. The principal difficulty that I the way of this conclusion is the existence of an insect is described by Mr. Baly (Cist. Ent. II. p. 46) as the e of *P. Lacordairei*, of which I have an apparently identical ple before me (its antennæ unfortunately have been broken This latter is very like *P. Lacordairei* ♂ and moreover is ale; its elytra are abbreviated and are dehiscent behind and nd femora are unarmed. The armature of the hind femora ver is certainly not a reliable sexual character as I possess amples of a species (described below) with unarmed femora is the abbreviation of the elytra indicative of sex as the ples of *P. Erichsoni* before me are all females and all have developed elytra. I doubt whether the example with short is *P. Lacordairei*—if it is I should take it to be an aberra- -but I find that its prothorax is differently shaped, having reatest width manifestly nearer to the middle than in *cordairei*, and moreover it comes from New South Wales I am not sure that the latter species occurs. Some years found a great number of *P. Lacordairei* and *Erichsoni* *rdairei* much the more plentiful) promiscuously under stones Port Lincoln, but there were no examples with shortened among them. It is of course a possibility that my example shortened elytra is not specifically identical with that bed by Mr. Baly. As far as my observations go—I have ted only the two forms described by Germar and the ple with shortened elytra—the females of this genus, as

compared with the males, are in general stouter and more robust with the antennæ and tarsi less slender and elongated—and have the hind body much less pubescent, the outline of the latter from the hind coxæ to the apex (viewed from the side) being straight or somewhat convex, while in the males it is concave.

P. gracilis, sp. nov. ♂ Angustus; elongatus; pubescens (elytris glabris exceptis); niger vel nigro-piceus, elytris fulvis maculis nigris notatis, antennis capite prothorace et pedibus (femoribus, nisi basin versus, piceis exceptis) plus minus rufescentibus; antennis gracilibus, corpore vix brevioribus; capite prothoraceque confertim minus fortiter punctulatis; elytris vix striatis, obscure lineatim punctulatis, interstitiis hic illic longitudinaliter subcarinatis, femoribus posticis inermibus; pedum intermediorum tarsis quam tibiæ sat longioribus. Long., 4½ l.; lat., 1⅓ l.

The pitchy black markings on the elytra are all longitudinal, and are placed as follows:—Three (the middle one on the suture) running from the base a short distance hindward, one on each elytron (beginning between the hinder part of the sutural and external anterior marks) reaching to considerably behind the middle, one close to the external margin behind the shoulder, and three or four placed side by side between the hinder part of the elongate juxta-sutural mark and the lateral margin.

Compared with *P. Lacordairei*, the antennæ are considerably more slender than in that species; the prothorax is pubescent, narrower, its greatest width nearer the middle, a little flattened, more strongly and very much more closely punctured; the femora unarmed; the tarsi (especially the intermediate) longer and more slender, the elytra not distinctly striate in any part but with the interstices between the rows of punctures distinctly subcarinate here and there. The unarmed hind femora will separate the present species from all previously described in the genus unless it be *pachytoides*, Baly, the hinder femora of which are uncharacterised—but that species differs from the present one *inter alia* in having the surface of the prothorax "rugose, coarsely punctured."

S. Australia; near Adelaide, &c.

P. robustus, sp. nov. ♂ Sat elongatus, postice angustatus; piceus vel rufopiceus, antennis palpis pedibusque rufescentibus, elytris rufis vel testaceo-rufis maculis nigris notatis; antennis minus gracilibus corpore vix brevioribus; capite crebre fortiter, prothorace sat fortiter minus crebre, punctulatis; elytris fortiter punctulato-striatis, interstitiis vix convexis sat fortiter punctulatis, striis apicem versus obsoletis; femoribus posticis in medio late obtuse dentatis, paullo ante

picem dente valido curvato armatis; pedum intermediorum arsis quam tibiæ vix longioribus. Long., 4½ l.; lat., 1½ l.

the two examples before me the elytra bear a black blotch e lateral margin close to the base and also a large basal spot e same colour which includes the scutellum, and sends off l black lines running hindward, and in both examples the e is black; in one of them the lateral margin is narrowly s, and each elytron bears a large elongate, irregular, black , commencing a good deal in front of the middle and reach- good deal behind the middle, almost touching the suture ell separated from the lateral margin, and also a smaller spot near the apex; in the other example there is only one spot (besides those near the front), which commences at the e and reaches thence about half way to the apex, and the l margin is scarcely infuscate. This species seems to be guished from all previously described by the following eters in combination:—Prothorax not longer than wide, strongly punctulate-striate with interstices punctured ly less strongly than the striæ. The antennæ scarcely from those of *P. Lacordairei*; the prothorax is at its widest nearer the middle that in that species; the elytra are less el, being gently narrowed hindward from the base.

Australia; I am not sure of the exact locality, but believe e in the Northern Interior.

PARACADMUS.

ucifugus, Baly. I have received from Mr. Froggatt, of Sydney, imen (said to be from the south of New South Wales) which tainly, I think, this species—stated by its author to be "Australia" without more exact mention of habitat. The le before me differs from the description—a very full one— following particulars, none of which could rightly be re- l as justifying specific separation—it is a little larger (long. stead of 2½ l.), the intermediate femora (not the hind only) nitish beneath, the prothorax (which is said to have in the few small, indistinct, obscurely fulvous spots on either side e "hinder disc") has an interrupted flexuous fulvous line ng forward from the base on either side, and gradually be- g indistinct towards the front; the front angles of the pro- do not to my eye appear to be "curved slightly outward," ytra behind are somewhat more than "obsoletely" costate, e dark mark on the second and third ventral segments is ng. There appears to be little doubt that *P. lucifugus*, is *Cadmus luctuosus*, Chp.; the latter name being of prior the insect should be called *Paracadmus luctuosus*, Chp.

culatus, sp. nov. Sat elongatus; subtus pallide albo-flavus;

pedibus (femoribus et tibiarum basi summa flavis exceptis) et antennis (articulis 6-9 flavis exceptis) nigris; supra niger; clypeo, labro, prothoracis marginibus (basi excepta) et utrinque vitta lata antice abbreviata, in elytris singulis maculis discoidalibus 3 longitudinaliter positis (maculis intermediis quam ceteræ majoribus), et elytrorum margine reflexo antice, læte flavis; capite creberrime rugulose subtilius, prothorace elytrisque crassissime rugulose, punctulatis; his postice subcostatis; antennis corpore sat longioribus. Long., $2\frac{1}{5}$ l.; lat., $1\frac{1}{5}$ l.

Australia; exact habitat unknown; a single example in the South Australian Museum.

PRIONOPLEURA.

P. crucicollis, Boisd. This is an extraordinarily variable species. I have before me a series which I obtained all together by sweeping *Eucalyptus*, and which unite *P. flavocincta*, Saund., with it, and go even beyond that variety to a form having the elytra almost entirely black, each bearing a large yellow spot. This latter* placed beside an ordinary specimen looks as if its markings are *essentially* different, but intermediate forms differ from typical *crucicollis* through a series in which the first departure varies only by the portion of the elytra lying between the two transverse series of black marks being slightly paler than the rest of the surface, and this pale portion in other specimens becomes still more conspicuous, and finally yellowish and bright yellow, while the black marks correspondingly unite together and overspread the part of the surface that is not yellow.

Cadmus cinnamomeus, Suff., is given by Gemminger and Harold as the female of *P. flavocincta*, Saund. I have never seen a specimen quite agreeing with Suffrian's type, which should have no markings at all on the prothorax, and therefore I am perhaps hardly justified in expressing a decided opinion, but it seems to me very probable that this also is a variety of *crucicollis*.

P. erudita, sp. nov. ♀ Minus elongata; subquadrata; supra ferruginea; capitis vertice et linea longitudinali antice bifurcata, prothoracis macula literam U simulanti et utrinque maculis aliis indeterminatis, scutello, et elytrorum maculis nonnullis fascias 2 (alteram pone basin alteram pone medium) interruptas formantibus, nigris vel nigro-piceis; corpore subtus pedibusque læte flavis, metasterni macula triangulari, femoribus tibiisque maculatim et tarsis, nigris; antennis gracilibus rufis, articulis basalibus 2 ultimoque nigris;

* Probably *Cadmus bimaculatus*, Dey. (never, I think, formally described), which Suffrian speaks of as a var. of *flavocincta*.

utello puncturis nonnullis instructo, haud carinato; elytris t crasse punctulatis, antice vix manifeste (postice sat identer) longitudinaliter costatis. Long. $2\frac{4}{5}$ l.; lat., $1\frac{3}{5}$ l.

prothorax is more gibbous than is usual in the genus; it dorsal channel, and is coarsely sculptured; the dorsal esembling the letter U does not quite reach either the base x. The species should be placed among those with non- elytra, although there are distinct traces of costæ near the one or two of which appear from some points of view to rward a little further than the rest. The markings on the are very much as in *C. histrionicus*, Chap., or a typical le of *C. crucicollis*, Boisd. From the latter of these the state elytra furnish a good distinction, from the former the r antennæ, which are a little longer than two-thirds of the

th Australia.

turalis, sp. nov. ♂ Minus elongata; minus convexa; staceo-ferruginea; capite (parte circa oculos excepta), rothoracis macula media longitudinali et nonnullis utrinque inoribus, scutello, elytrorum sutura humerisque, antennis rticulis 2-5 exceptis), metasterni macula media triangulari, moribus subtus et supra, tarsorumque articulis ultimis 2, igris; antennis corpori longitudine æqualibus; prothorace l latera fortiter denticulato; scutello longitudinaliter rtiter carinato, opaco (carina marginibusque nitidis ex- ptis), crasse ruguloso; elytris confuse sat fortiter punctu- tis. Long., 3 l.; lat., $1\frac{4}{5}$ l.

lto magis convexa, antennis corpore multo brevioribus ifis (articulo 1° excepto), elytris maculis nigris sat umerosis ornatis.

male *Prionopleura* in the South Australian Museum at unknown) seems to be referable to this species, although ennæ considerably longer than those of the type, and the e of a black humeral spot on the elytra may possibly indi- new species.

th Australia; near Port Lincoln.

only species previously described as presenting the combi- of non-costate elytra with a prothorax strongly crenulate e sides are *P. cognata*, Saund., 4-*tuberculata*, Suff., *nica*, Chap., and *rugicollis*, Gray. Of these, the former e said to be the sexes of a single species, the male of which *rculata*) differs from the present species *inter alia* by its antennæ and tubercled elytra, the female (*cognata*) by its ifferent markings, yellow scutellum, &c.; while *histrionica*, may be at once distinguished from it by the strongly com-

pressed apical joints of its antennæ, and *rugicollis* by its male having red antennæ. *P. salebrosus*, Guér., is described as entirely devoid of markings on the upper surface. *P. trispilus*, Chap., has the prothorax laterally denticulate and the elytra "*obsoletissime costata*;" but even if the latter character represent a costation scarcely distinguishable from none at all, the antennæ, prothorax, and elytra are all described as quite differently coloured from those of the present species. All the other described species of *Prionopleura* are stated by their authors to have costate elytra or the prothorax non-denticulate, or both.

CHALCOLAMPRA.

C. rustica, sp. nov. Sat elongata; haud parallela; ænea, antennis palpisque testaceis, pedibus obscure rufis (femoribus paullo æneo-micantibus); prothorace duplo-punctulato; elytris subtiliter punctulato striatis, interstitiis planis crebre minus subtiliter punctulatis. Long., 2½ l.; lat., 1⅗ l.

The third joint of the antennæ is more than half again as long as the fourth. Compared with the common *C. ænea*, Boisd. (*acervata*, Germ.), the following points of difference may be noted (apart from colour):—The antennæ are very much more slender, the prothoracic punctures of the larger system are much smaller and less coarse, the prothorax is wider (being very fully twice as wide as long), and is narrower as compared with the elytra (which, at their widest, are more than half again as wide as it), the punctures in the elytral striæ are finer and much more closely placed, and the interstices of the elytra are more perfectly flat and are closely punctured. Of the previously-described species of *Chalcolampra* not differing from this one so conspicuously as to make comparison superfluous, *C. Hursti* has distinctly convex elytral interstices; *laticollis* and *simillima* have the prothorax as wide as the elytra; *parallela* has the elytra parallel (in this species they are oval), and *luteicornis* and *Adelaidæ* have the prothorax of equal width with the base of the elytra to which they are very exactly fitted (in this species the base of the elytra is considerably wider than the base of the prothorax).

Yilgarn, W. Australia; sent to me by C. French, Esq.

CALOMELA SEXMACULATA, *Jac.*

This species is stated in Masters' Catalogue to occur at Rockhampton, Queensland. On turning up the only reference given (E.M.M., 1885, p. 224), the habitat is found to be there entered as "Point Moresby, New Guinea." I suspect the name has found its way into the Australian Catalogue by an oversight.

PAROPSIS.

sp. nov. Ovata; in medio fortiter gibbosa; rufa, albis elevatis numerosissimis ornatis; crasse rugu- crebre punctulata; prothoracis lateribus leviter arcu- e sat mucronatis. Long., 5½ l.; lat., 3⅔ l.

sity is so placed that (the insect being viewed from highest point is slightly in front of the middle of ut slightly behind the middle of the whole body, and ht of the insect at that point is greater than half the e elytra. The colour is a decided red, with the an- nd legs somewhat pallid, and the whole upper sur- with ivory-like yellowish-white, as follows:—The lotches on the head, the lateral and anterior margins r of indeterminate blotches on the prothorax, the e anterior and lateral margins, and a great number ches on the elytra and the tarsi. The puncturation upper surface is strong and rugulose; it is coarsest e on the elytra, closest and least coarse on the head. ation of the summit of the gibbosity on the elytra is, rse and not rugulose. The prothorax is twice and a wide as long, the puncturation of its disc is some- diate in character between that of the head and of the puncturation of its sides is very coarse and

with *P. reticulata*, Marsh., apart from colour and the the elytra, the present insect has the head and disc very much more strongly and closely punctured, the its front angles less conspicuously mucronate, its ess strongly rounded, and its hind angles quite well e elytra are sculptured (leaving the whitish blotches nt) very much as those of *P. reticulata*, but are at ttle more coarsely, and behind a little more closely The undersurface is scarcely different from that of The apical ventral segment of the female is sparingly fine, deep, and conspicuous punctures.

s belongs to Dr. Chapuis' First Group of *Paropsis*.

I am uncertain of the exact habitat.

sp. nov. Subrotundata; convexa; fulvo-testacea, extrorsum et abdomine subinfuscatis; prothorace rotundato-dilatato, disco sparsi indistincte punctu- teribus impressis sat crebre varioloso-punctulatis, anticis sub-mucronatis posticis plane rotundatis; crebre profunde punctulatis, interspatiis fortiter verrucosis.

um anticorum articulo 1° subtus ovali planato. l.; lat., 4 l.

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The almost unicolorous fulvous or yellowish-brown colour, together with the non-bisinuate sides of the prothorax and the elytra quite as strongly and closely verrucose as those of *P. reticulata*, Marsh., will distinguish this species from all its intelligibly described congeners appertaining to Dr. Chapuis' First Group (of which it is a member), except *P. reticulata*, Marsh., from which (disregarding colour) it differs *(a)* in shape, being evidently less strongly convex, and with a much more rounded outline, *(b)* in sculpture, the close-set wart-like elevations on its elytra being (not *larger* in area, but) more prominent than in *P. reticulata*, and more spread over the whole surface, being well defined even around the scutellum. The punctures on the disc of the prothorax are individually much less distinct than in *P. reticulata*, and are not collected into clusters as they are in that species. The prosternum resembles that of *P. reticulata*.

Kangaroo Island; taken by Mr. J. G. O. Tepper.

P. nitidissima, sp. nov Breviter ovata; convexa; rufo-ferruginea; mandibulis apice, labro medio, antennis (articulis basalibus 4 exceptis), linea longitudinali media maculaque utrinque rotundata et in vertice et in prothorace, signaturis nonnullis longitudinalibus in elytris, mesosterni metasterniique macula laterali, et genubus, nigris; capite prothoraceque minus nitidis subcoriaceis et crebrius sat subtiliter punctulatis, hoc quam longiori plus duplo latiori ad latera vix impresso; scutello elytrisque nitidissimis; illo lævigato; elytris crebre subtiliter (quam prothorax magis subtiliter) punctulatis, lineis longitudinalibus lævigatis vix manifeste notatis. Long., 5 l.; lat., $3\frac{2}{5}$ l.

In the example before me the black marks on the elytra appear to be fragments of three parallel longitudinal discal lines, of the inner two of which there is only a short piece slightly behind the base while the external one consists of a post-basal fragment, an elongate median piece, and a sub-apical spot; the short central longitudinal black line with a black spot on either side of it on both head and prothorax is a very distinctive character if constant. The prothorax at its widest is nearly half again as wide as across the tips of the front angles (which are well produced but not very acute), and is to the greatest width of the elytra about as 12 to 17; the sides have a distinct upturned (or thickened) margin, inside which is a well defined but narrow (scarcely wider than the margin itself) gutter; the thickened margin is not continued along the base, and only for a very short distance along the front; the sides diverge not very strongly and almost in straight lines from the front angles almost to the base and then are strongly rounded and converge to the base into which they merge without a distinct angle. The puncturation of

othorax and elytra is perfectly even (*e.g.*, does not alter
racter at all towards the margins), except that on the
here is a scarcely traceable indication of some longitudinal
e lines (they are so faint and irregular on the example
ne as to be perhaps only accidental). Looked at obliquely
e side, the humeral angles of the elytra appear very well
and the external outline of the elytra is quite strongly
from the humeral angles nearly to the middle of the
The under surface is nitid and without distinct sculp-
The prosternum is widely and strongly compressed along
e length, the surface of the broad elevation thus formed
attened and protruding well behind the anterior coxæ, its
xtremity being strongly and triangularly emarginate; its
etween the anterior coxæ is about equal to the width of
erior tibiæ at their apex. This species belongs to Dr.
' Second Group of *Paropsis*.
Wales, Richmond River district; sent to me by Mr. T.
ne.

sphærica, Chap., var.? *Meyricki*. Hemisphærica; valde
vexa; nitida; supra rufo-testacea, capite paullo obscuriori,
ndibulis apice et antennis (articulis basalibus nonnullis
eptis) nigris; subtus nigra, lateribus metasterni medio et
lominis apice ferrugineis; pedibus ferrugineis; capite
bre sat crasse punctulato haud longitudinaliter impresso;
othorace quam longiori fere triplo latiori, crebre subtilius
aspere punctulato, ad latera paullo crassius punctulato
iter impresso; scutello punctulato; elytris sat fortiter sat
bre (quam prothorax minus crebre) punctulatis, interstitiis
bre minute punctulatis, lineis longitudinalibus sublævibus
manifeste notatis. Long., $3\frac{1}{2}$—4 l.; lat., $2\frac{1}{6}$—3 l.
hape of the prothorax is characteristic; looked down upon
ne point whence its length seems greatest the head has
the appearance of being inserted into a cavity formed by
traight lines constituting the front margin of the pro-
and a line drawn across the greatest width of the pro-
(where it is about half again as wide as across the tips of
t angles) would fall scarcely behind its line of contact
e back of the head; the sides and base of the prothorax
almost continuously even curve; the sides have a well-
thickened margin, inside which the lateral gutter is a
ria, and this thickened margin is quite defined all along
t margin and base. The puncturation of both prothorax
tra is a little coarser and stronger near the lateral margins
ewhere. Looked at obliquely from the side the humeral
f the elytra appears much rounded off and the external
of the elytra appears as somewhat evenly and gently con-

vex with a long slight sinuation behind the middle. The undersurface is nitid and strongly and sparingly punctured except on the metasternum, the greater part of which is hardly punctulate, but is transversely strigose. The prosternum is narrowly carinate, the carina being flattened above and sulcate down the middle; between the anterior coxæ it is scarcely so wide as the width of the second joint of the maxillary palpi. The convexity of the body is so great that if it be looked at from the side the length of the elytra is only about one-seventh greater than the height of the insect (*i.e.*, the distance from the under to the upper surface). The antennæ are three-fifths as long as the whole body. Belongs to Dr. Chapuis' Second Group of *Paropsis*.

This species is perhaps a form of *P. hemisphærica*, Chap., stated to be from "Australia" without more precise mention of locality. As I have before me several specimens all differing from the description in the middle part of the metasternum being more or less testaceous and the antennæ (except at the base) being quite black, it does not seem out of place to give it a distinctive name as being at least a well-marked variety.

W. Australia; taken by E. Meyrick, Esq.

P. mimula, sp. nov. Hemisphærica; valde convexa; nitida; rufo-testacea, palporum articulo ultimo et antennis (articulis basalibus nonnullis exceptis) nigris; capite crebre sat fortiter punctulato haud longitudinaliter impresso; prothorace quam longiori duplo latiori, subtiliter sat sparsim punctulato, ad latera crasse punctulato nec impresso; scutello haud punctulato; elytris sat fortiter sat crebre (quam prothoracis disco multo fortius) punctulatis, interstitiis minute nec confertim punctulatis, lineis longitudinalibus sublævibus vix manifeste notatis. Long., 3⅛ l.; lat., 3 l.

Apart from the differences of puncturation, &c., mentioned above, this species is very like *P. Meyricki*, but is even more spherical than that species. The shape of the prothorax is almost identical in the two, but in the present species that segment is (by measurement) decidedly less strongly transverse than in the other. The undersurface has no distinct puncturation. The external outline of the elytra and the structure of the prosternum are as in *P. Meyricki*. The antennæ are distinctly shorter than in that species. This insect, as also the preceding one, differs from its near allies in the combination of antennæ quite black (except near their base) with the almost complete absence on the elytra of longitudinal lævigate spaces.

South Australia, Yorke's Peninsula.

P. confusa, sp. nov. Ovata; sat convexa; nitida; testacea, elytris (his fusco-punctulatis), et nonnullis exemplis pro-

race abdomineque, plus minus fusco-umbratis; prothorace
m longiori vix duplo latiori, sat crebre duplo-punctulato,
ra versus profunde impresso et crassius punctulato,
ulis anticis productis acutis posticis rotundatis, lateribus
e medium sat rotundatis antice vix sinuatis; scutello
tiliter sparsim punctulato; elytris subfortiter sat crebre
fuse punctulatis, lineis longitudinalibus sublævibus vix
nifeste instructis, puncturis circa scutellum magis sparsim
itis. Long., $3\frac{1}{5}$—$3\frac{3}{5}$ l.; lat., $2\frac{2}{5}$—$2\frac{3}{5}$ l.

exes do not seem distinguishable externally except by the
haracters of the tarsi. The prothorax is at its widest a
front of the base, which is about half again as wide as
nt. The puncturation of the head scarcely differs from
the prothorax; it consists of larger and smaller punctures
venly mingled, the larger punctures, however, being much
than those on the disc of the elytra. The lateral impres-
the prothorax is particularly well marked, but the punc-
of the lateral surface is not so coarse as in many others
enus. There is no marginal space of the elytra definitely
off by its special puncturation, but the puncturation of
eral surface becomes evidently stronger as it approaches
rgin. The shoulders are much rounded, and the elytral
is scarcely sinuate behind them. The prosternum is
e, sulcate down the middle, gradually wider hindward;
ind apex (which is rounded) about as wide as the truncate
the maxillary palpi. The undersurface is almost lævigate,
the hind body, which bears some fine sparse puncturation.
ennæ reach back to about the apex of the metasternum.
examples they are a little infuscate towards the apex.

species belongs to Dr. Chapuis' Second Group of *Paropsis*,
unt of its elytral puncturation being non-rugulose, and
ning in rows. It does not seem very close to any pre-
described species.

garoo Island; taken by Mr. J. G. O. Tepper.

rcumdata, Newm. The brief description of this species is
word for word identical with the description of *P. rufipes*,
In the absence of any direct evidence to the contrary,
n's name should be dropped as a mere synonym.

a, sp. nov. Ovalis; convexa; nitida; rufo-testacea, capite
othoraceque plus minus æneseentibus, elytris æneo-vel viridi-
gris, antennis corporis dimidio brevioribus; capite sat
rtiter punctulato; prothorace quam longiori multo plus
plo latiori, crebrius subtilissime (latera versus puncturis
nnullis sat magnis additis) punctulato, a basi ad apicem
cuatim angustato, angulis anticis parum productis parum

acutis, posticis bene distinctis, lateribus leviter sat æqualiter rotundatis; scutello haud punctulato; elytris vix striatis, striis subtiliter punctulatis, interstitiis punctulatis, puncturis in interstitiis quam in striis vix subtilioribus. Long., $2\frac{1}{2}$—3 l.; lat., $1\frac{3}{5}$—$1\frac{4}{5}$ l.

This species has a certain superficial resemblance to a *Gyrinid.* I have seen a good many specimens, and they do not show any tendency to variation except in the extent of the æneous colouring on the head and prothorax. The elytra are of a deep black-green colour, without any other tint whatever except at the base of the epipleuræ, of which the inner portion of the dilated piece (adjacent to the metasternum) is invariably bright-testaceous. The head (especially towards the sides and on the clypeus) is more strongly punctured than the disc of the prothorax or the elytra. The prothorax is punctured about as strongly (on the disc) as the interstices of the elytra, which are not much more finely punctured than the fine scratch-like striæ; the punctures in the interstices differ a little in character from those of other parts of the surface, being like fine somewhat longitudinal scratches. The prosternum is carinate along its whole length, the carina prominent and acute in front, gradually dilated hindward, at its truncate hind-extremity slightly wider than the length of the basal joint of the antennæ, bisulcate, the space between the sulcæ (or striæ) convex. The under surface is very nitid, scarcely distinctly punctulate.

Dr. Chapuis has very briefly described two species (*P. æneipennis* and *subæneseens*) from Queensland and New South Wales which seem to be near the present insect. They, however, both appear to be smaller than the smallest specimen I have seen of *P. æneu*; the former is said to be "*ovata*" and the latter "*breviter ovata*," and in neither case does the description of colour quite agree with the present insect, which at any rate (even if the discrepancies in size and shape can be got over) is a well-marked local form in point of colour.

South Australia.

P. polyglypta, Germ. Dr. Chapuis is, I think, in error, in regarding this as identical with *P. intacta*, Newm. The description of the latter species is an exceptionally poor one, relating literally only to size, colour, and markings. *P. polyglypta*, on the other hand, is well and sufficiently described. Newman states that his insect came from Port Philip, and Germar that his was taken near Adelaide. Now a species agreeing well with Germar's description is very plentiful around Adelaide, and is undoubtedly *P. polyglypta*, and I have before me from Melbourne a species perfectly distinct from *polyglypta*, and agreeing with Newman's description of *intacta* quite as well as Germar's *polyglypta* does. The colour and markings of these two do not

in any way that I can specify ; *polyglypta* being very vari
n markings it is probable that the other is also variable.
nale of the Victorian insect, which I regard as *P. intacta* (I
not seen a female) is distinctly shorter (in proportion to its
h) than the male of *P. polyglypta*, with more rounded sides.
olyglypta the prothorax is quite distinctly more transverse,
(by measurement) very nearly twice and a half as wide as
its base is not quite half again as wide as its front margin,
des are very evidently rounded, and its greatest width is
n front of the base. In *intacta* the same segment is scarcely
and a-third as wide as long, its base is slightly more than
again as wide as its front margin, its sides are only very
ly rounded, and its greatest width is almost at the actual

roggatti, sp. nov. ♀ Ovata ; sat nitida ; supra testaceo-
livida ; capitis macula media magna, prothoracis macula
media magna et utrinque maculis 2 minoribus longitudinali-
ter positis, scutello pro parte, et elytrorum singulorum
macula humerali sutura striisque 10, nigricantibus ; subtus
atra, nitida, pro- et meso-sternis ad latera rufescentibus ;
pedibus palpis et antennis testaceis (harum parte dimidia
apicali nigricanti) ; capite prothoraceque crebre duplo-punc-
tulatis, hoc latera versus late impresso vix crassius punc-
tulato ; scutello lævi ; elytris profunde striatis, striis
irregulariter fortiter biseriatim punctulatis, interstitiis
fortiter convexis nullo modo (nisi juxta basin) punctulatis.
Long., 7 l. ; lat. 5 l.

ery much like *P. polyglypta* and *intacta* in respect of the
ring and pattern of the upper surface, but at once dis-
ishable from both those species by the perfectly black under-
(paler only on the sides of the head, prosternum and meso-
um), and by the entirely different sculpture of the elytra, on
h the striæ are deeper, and especially wider, each bearing
evidently *two* rows of coarse punctures, somewhat mixed
her, and the interstices are quite strongly convex, and in
hinder two-thirds entirely devoid of puncturation. The
le differs from that of *P. polyglypta* in its elytra being
edly more (and more abruptly) widened behind the middle.
ew South Wales, taken in the Australian Alps ; and sent to
y Mr. Froggatt, of Sydney, to whom I have much pleasure
edicating the species.

PAROPSIS NIGERRIMA, *Germ.*

his species is, I think, only a variety of *P. alternata*, Germ.,
the testaceous markings absent. I can find no other dis-
ion.

PHYLLOTRETA.

P. australis, sp. nov. Subovata; nigra; antennis (harum articulo 5° paullo elongato) tibiisque basi rufis vel testaceis, elytris vitta discoidali (basi introrsum flexa, apice intus leviter arcuata et extus leviter dilatata) flavo instructis; supra confertim punctulata. Long., 1 l.; lat., ½ l.

Extremely like the European *P. undulata*, Kuts., the yellow stripe on the elytra being quite as in that species; but the puncturation throughout is very much closer and finer. From *P. bivittata*, Waterh. (the previously described Australian species of the genus), this species differs in the colouring (Mr. Waterhouse says that the antennæ and legs of his insect are invariably totally black), and also apparently in the puncturation; Mr. Waterhouse compares *P. bivittata* to *P. nemorum*, Linn., and says that the *prothorax* is more closely punctured, thus implying that the puncturation of the elytra is similar to that of *P. nemorum*, but in the present insect the elytra are very much more closely and finely punctured.

South Australia; also Victoria; on *Cruciferæ*.

BUPRESTIDÆ.

MELOBASIS.

M. costata, Thoms. (Typ. Bupr. App. I., p. 16). This name is preoccupied by Sir W. Macleay. Judging from the descriptions, it is possible that both names refer to the same insect, which (pending the decision of this point) should stand thus—*M. costata*, Macl. (Trans. Ent. Soc., N.S.W., II., p. 24); ? *costata*, Thoms. (loc. cit.).

M. costifera, Thoms. (loc. cit., p. 16). There can hardly be a doubt that this is identical with *M. costata*, Saund., since renamed "*Saundersi*," Masters.

M. prasina, Thoms. (loc. cit., p. 17). The description of this insect hardly distinguishes it from some vars. of *M. verna*, Hope, though it is very likely to be distinct.

M. purpureosignata, Thoms. (loc. cit., p. 18). For this name —previously used for a *Melobasis* by Laporte and Gory—I propose *Thomsoni* as a substitute.

M. viridiobscura, Thoms. This species must be very close to *M. obscura*, Saund., which I renamed (*obscura* being a preoccupied name) *sordida* (Tr. Roy. Soc., S.A., 1887, p. 238). There are some discrepancies (*e.g.*, M. Thomson does not refer to the transverse wrinkling of the prothorax, and his "*elytra obsolete striata*" hardly fits *M. sordida*), which render it probable that the types, if placed side by side, would be found to differ, but it is perhaps

aw attention to the possibility of identity, as M. Thom-
e would have priority if the insects are not distinct.

ANILARA.

son, in his Typ. Bupr. App. I., describes two new
this genus—*platessa* and *Deyrollei*—from Adelaide
which is known to me. Judging from the description
ter, I should say that *A. planifrons*, Blackb., is very
at M. Thomson's statement of his insect "corpus subtus
sat grosse rugoso-punctatum" is quite conclusive as to
g specifically distinct. The description of *A. platessa*
oo short, but it reads very like a description of the
ich I take to be *A. Adelaidæ*, Hope; unfortunately,
M. Thomson does not mention whether the vertex bears
sed line, and in the absence of information on that
s impossible to decide the matter. Mr. E. Saunders
1868, p. 19) published an enlarged but still brief de-
of the type of *A. Adelaidæ*, accompanied by a figure
kes it appear a wider species than the measurements
o the description would show it to be. The types which
it agree with the figure.

STIGMODERA.

received by the courtesy of M. Kerremans a copy of a
nemoir recently published by him containing notes on
ecies of this genus, together with some ably-written
ns of new species. The following remarks on the
ill perhaps be of interest:—

, Kerrs. This species is very probably identical with
llis, Waterh. (var. *major*). If so, M. Kerremans seems
nsidering it a good species.

a, Saund. The author points out very rightly that Mr.
substitution of this name for *Parryi*, Hope (a substi-
pted in Masters' Catalogue) is quite unjustifiable.

elnaudi, Thoms. (nec Saund.). The author proposes for
(which is preoccupied) the substitution of "*Laportei*."
rtei is itself preoccupied, having been used for a *Stig-*
M. Boheman, and also Mr. Masters had already sub-
Thomsoniana" for *Castelnaudi*, Thoms. (Proc. L. S.,
XII.).

dis (White, ms.) Kerrs. The author furnishes a des-
f this previously undescribed insect, but he seems to
ooked the fact that the name has been previously used
. W. Hope and accepted and published by Laporte and
a different insect. I propose, therefore, for the present
e name *Kerremansi*.

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S. distinguenda, Thoms. For this, the name being preoccupied, the author proposes to substitute "*fraterna*."

S. flava, Thoms. This name being preoccupied, the author proposes "*flavidula*," overlooking the fact that Mr. Masters (loc. cit.) has already proposed *flavescens*.

S. cœlestis, Kerrs. The name *cœlestis* being pre-occupied by M. Thomson (Arch. Ent. I., p. 113), I propose "*stillata*" as a substitute.

S. obesissima, Thoms. (Typ. Bupr. App. I., p. 32). The habitat given for this species is simply "Australia." I have seen an example belonging to Mr. C. French, which was taken in Queensland.

S. marmorea, sp. nov. ♂ Minus lata; minus convexa; sat nitida; nigro-ænea, elytris obscure rufis testaceo-maculatis; capite sternisque dense, abdomine sparsius, griseo-pilosis; capite vix concavo, linea longitudinali leviter impresso, confertim subtilius punctulato; prothorace quam longiori (et postice quam antice) duabus partibus latiori, confertim subtilius punctulato et minus crasse (ad latera magis fortiter) vermiculato-ruguloso, antice fortiter bisinuato vix concavo, lateribus leviter arcuatis, basi leviter bisinuata; elytris fortiter striatis, striis subtiliter punctulatis, interstitiis subcarinatis subtiliter sparsim punctulatis, interstitio 6° ad basin late crasse ruguloso postice punctis nonnullis magnis instructo, margine basali leviter æqualiter convexo, apice leviter truncato; corpore subtus crebre subtilius sat æqualiter sat aspere (abdomine minus crebre minus aspere) punctulato; segmento ventrali apicali quam penultimum parum longiori, paullo magis crebre punctulato, apice arcuatim emarginato. Long., 14½ l.; lat., 5 l.

The testaceous spots on the elytra are not very conspicuous or well defined, and probably are variable. In the example before me there are on each elytron an elongate spot running backward from the middle of the base, a small spot near the suture a little in front of the middle, two or three small spots placed transversely a little behind the middle, and a larger oval spot placed transversely near the apex, and the lateral margin is narrowly testaceous except close to the base and apex, its testaceous colour being a little dilated inward at intervals along its course. From the position of the testaceous spots I should conjecture that in some examples the elytra might bear four more or less interrupted transverse fasciæ. An elevated carina (abbreviated at both ends) runs down the prothorax of the example before me but is perhaps the result of the vermiculate interstices being accidentally continuous at that part.

ct must be placed among the large vermiculate-rugu-
s of *Stigmodera*, but I do not know any species to
n say that it is nearly allied; perhaps it suggests the
chei, L. & G., as much as anything.
to compare it with a well-known and common species
eside an example of *S. Mitchelli*, Hope, and find that
ng colour and markings)—the head differs chiefly in
e and very much more closely and finely punctured—
ax chiefly in being vermiculately rugulose with the
the rugæ very closely punctulate, and also in having
ery much less strongly rounded and its front margin
ngly bisinuate—the elytral sculpture is not very
and the sculpture of the underside differs chiefly in the
ments being more closely punctured and a little more
rugulosity. The general form is much more elongate
oust than that of *S. Mitchelli*. The extremely crowded
f the prothorax seems to be a very distinctive charac-
very much more crowded than in *S. grandis*, Don.—
o than in *S. Stevensi*, Gehin.
alia; a single example in the S. Australian Museum.

sp. nov. - ♀ (?) Minus lata; sat convexa; sat nitida;
sat alte griseo-pilosa; supra sanguinea, capite pro-
e (lateribus exceptis) et elytrorum fasciis 3 margineque
nigro-cœruleis; corpore subtus pedibusque cyaneis,
rni abdominisque lateribus et hujus apice sanguineis;
inter oculos longitudinaliter concavo, subtilius sat
punctulato; prothorace ad latera vix manifeste mar-
, quam longiori (et postice quam antice) vix duabus
us latiori, crebre sat fortiter punctulato, antice vix
atim leviter concavo, lateribus sat rotundatis, basi
bisinuata; elytris fortiter striatis, striis subtiliter
latis, interstitiis sub-carinatis subtiliter sparsim punc-
, interstitio 6° ad basin late ruguloso, margine basali
convexo, apice rotundato; corpore subtus crebre sub-
sat aspere (abdomine paullo minus crebre vix aspere,
in medio sparsim) punctulato; segmento ventrali
quam penultimum sat longiori, subtiliter creberrime
lato, postice transversim depresso et subtruncato;
ulis simplicibus. Long., 9—10½ l.; lat., 4—4¼ l.
kings on the prothorax and elytra scarcely differ from
Mitchelli, Hope, and probably are equally variable.
examples before me those on the elytra differ so much
fascia in one being much broader than in the other,
dmost fascia in one being reduced to two spots) that
waste of space to describe them. The species is very
Mitchelli, but very distinct, differing from the corres-

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ponding sex of that insect as follows:—The head is much more hollowed out down the middle, and evidently more closely and finely punctured; the prothorax is at its widest nearer to the base, and its thickened lateral edging is almost obsolete; the elytra are not in the least sinuate at the apex, and the apical ventral segment is very much more closely and finely punctured, and its hinder portion is abruptly depressed—almost concave transversely—its apex, moreover, being almost sharply truncate instead of evenly rounded. (In the other sex of *Mitchelli* this segment is arcuately emarginate at the apex.) In the examples before me the sanguineous lateral border of the prothorax is wider than the pale margin in any specimen that I have seen of *Mitchelli*.

Kangaroo Island; taken by Mr. J. G. O. Tepper.

S. jubata, sp. nov. ♀ (?) Minus lata; minus convexa; nitida; omnino (elytris exceptis) pilis subtilibus erectis griseis sparsim vestita; versicolor (altero situ viridis vel æneoviridis, altero splendide cuprea vel purpurea); elytris singulis vitta discoidali angusta (postice dilatata) a basi usque ad medium producta, macula marginali pone humerum, et macula transversa arcuata ante apicem posita, flavis ornatis; capite prothoraceque subtilius sat crebre punctulatis; illo longitudinaliter late leviter concavo; hoc ad latera haud marginato, quam longiori (et postice quam antice) dimidia parte latiori, antice bisinuatim leviter concavo, lateribus leviter arcuatis, basi leviter bisinuata; elytris striatis, striis punctulatis, interstitiis minus convexis vix manifeste punctulatis, apice truncato et vix bispinoso, marginibus postice haud denticulatis; corpore subtus subtiliter (sternis in medio sparsim latera versus crebre, abdomine minus crebre) punctulato; segmento ventrali apicali quam penultimum paullo longiori, vix aliter punctulato, postice rotundato-truncato, ante apicem in medio leviter sub-foveato; unguiculis simplicibus. Long., 9 l.; lat., $3\frac{1}{5}$ l.

Tasmania; in the collection of C. French, Esq.

S. Frenchi sp. nov. ♀ (?) Sat elongata; minus convexa; sat nitida; subtus et in capite griseo-pilosa; capite, pedibus, prothorace (hoc ad latera maculatim flavo), sternis (his ad latera et hic illic maculatim flavis), segmentorum ventralium marginibus anticis posticisque et maculis nonnullis lateralibus, pedibusque, nigris vel cæruleo-nigris; elytris pallide flavis, postice latera versus læte sanguineis, basi anguste ænea, sutura ab apice fere ad scutellum sat late cyanea; hoc colore circum apicem, pone medium (rotundatim), ad medium (fasciatim), et ante medium oblique antrorsum, utrinque

dilatato; capite prothoraceque sat crebre subfortiter punc-
tulatis; illo longitudinaliter sub-tri-sulcato, sulco medio lato
parum profundo, sulcis lateralibus vix perspicuis; hoc ad
latera haud marginato, quam longiori (et postice quam antice)
fere duabus partibus latiori, antice bisinuatim vix concavo,
lateribus a basi fere ad medium subrectis antice arcuatim
convergentibus, basi in medio latissime lobata; elytris
striatis, striis subtiliter punctulatis, interstitiis leviter con-
vexis minus subtiliter punctulatis, apice rotundato, mar-
ginibus postice haud denticulatis; corpore subtus minus
fortiter minus crebre (sternis ad latera sat fortiter sat crebre)
punctulato; segmento ventrali apicali quam penultimum fere
duplo longiori, haud aliter punctulato, postice rotundatim
(fere angulatim) producto; unguiculis ad basin haud dentatis.
Long., 11 l.; lat., 4 l.

very distinct species. The elytra are of a very pale straw-
r, the lateral margin from about the middle to a little before
pex being bright-scarlet, this scarlet patch increasing in width
its front hindward. Looking at the two elytra together,
es the cyaneous markings as one large continuous figure of
complicated pattern nowhere touching the margins except
apex. By a little exercise of the imagination this figure
be regarded as bearing some resemblance to a human form
l, the rounded portion (deeply emarginate in front) near the
lum being taken as the head, the fascia-like extension on
side (about the middle) representing the arms extended,
unded dilatation (behind the middle) representing the out-
f the bent legs, and the edging that runs round the apex
ng the feet.

lging from the description of *S. rubricauda*, Waterh., I should
that this species resembles it, but that insect appears to be
r, with the prothorax unicolorous and the elytra "bluntly
d" at the apex (in *S. Frenchi* they are quite evenly rounded).
ark markings on the elytra of *rubricauda* appear moreover
confined to the base, the hind part of the suture, and the
ne apex.

should be noted that the wide shallow lobe forming the
e portion of the hindmargin of the prothorax falls into a
sponding emargination in the front of the elytra, as in
nguinea, Saund., *viridicincta*, Waterh., and allied species,
which, I think, the present insect should stand.

toria; presented to me by C. French, Esq.

immeræ, sp. nov. ♀ (?) Lata; sat depressa; sat nitida;
obscure ænea; prothorace (marginibus anguste æneis exceptis)
et abdominis lateribus apiceque rufis; elytris rufo-testaceis,
margine antico et apicali (anguste) suturaque (angustissime,

nihilominus paullo pone scutellum minus anguste) æneis; capite sat fortiter sat crebre punctulato, longitudinaliter concavo et linea subtili impresso, prothorace ad latera marginato, quam longiori (et postice quam antice) fere duplo latiori, antice fortiter bisinuato vix concavo, rugulose fortiter sat crebre (postice in medio minus crebre) punctulato, linea mediana (antice obsoleta) lævi notata, lateribus fortiter rotundatis, basi undulatim bisinuata; elytris striatis, striis subtiliter punctulatis, interstitiis sat convexis sparsim minus subtiliter punctulatis, apice rotundato, marginibus postice haud denticulatis; corpore subtus (a capite ad apicem gradatim minus crebre magis crasse nihilominus sternis in medio sparsissime) rugulose punctulato; segmento ventrali apicali quam penultimum paullo longiori, postice late rotundato, apicem juxta leviter depresso sat crebre subtilius punctulato; unguiculis basi fortiter dentatis. Long., 13 l.; lat., $5\frac{1}{2}$ l.

Near *S. sanguiniventris*, Saund., from which (apart from want of pilosity, which may be sexual, and colour) the present species differs *inter alia* by the apices of its elytra being each quite evenly rounded. The difference of colour is chiefly seen on the prothorax, which in this insect is entirely red on the upper surface (except a narrow brassy edging) and entirely blackish-green beneath, while the same segment in *sanguiniventris* is of a dark bronzy colour, with its lateral margins both above and below red.

The base of the prothorax and front margin of the elytra are fitted to each other in the same manner as in *S. sanguinea*, Saund., *sanguiniventris*, Saund., &c., but this sculpture is less strongly defined than in those species.

Victoria, Wimmera district; in the collection of C. French, Esq.

S. Victoriensis, sp. nov. ♀ (?) Sat angusta; sat convexa; sat nitida; ænea (certo adspectu cuprea vel purpurascens); prothoracis lateribus et in elytris singulis signaturis quinis (sc. macula prope scutellum subrotundata, macula marginali elongata pone basin, fascia vix antemediana suturam haud attingenti, fascia pone medium suturam haud attingenti et macula parva subapicali), flavis; capite (hoc profunde longitudinaliter concavo) prothoraceque sat crebre sat fortiter punctulatis; prothorace ad latera haud marginato, quam longiori (et postice quam antice) dimidia parte latiori, antice leviter concavo leviter bisinuato, linea mediana irregulari lævi instructo, latitudine majori sat longe pone medium posita, lateribus sat fortiter rotundatis, basi fortiter bisinuata; elytris punctulato-striatis, interstitiis punctulatis

subplanatis postice convexis, apice oblique emarginato
so (spina externa multo majori), lateribus postice sub-
crenulatis; corpore subtus crebre subtilius (sternis in
multo minus crebre) punctulato; segmento ventrali
quam penultimum vix longiori, postice truncato vix
crebre punctulato, apicem juxta declivi; unguiculis
ibus. Long. 7 l.; lat., $2\frac{3}{5}$ l.

turation of the prothorax becomes gradually coarser
arse from the front to the base, but is not noticeably
he sides. The upper surface is in colour and markings
ike that of *S. cupreoflava*, Saund. (figured in Ins.
1, t. 1, fig. 14), but differs in the prothorax having
argins yellow, in the basal spot on each elytron being
lateral spot not reaching the shoulder, the hindmost
pot not being continued hindward along the margin,
sence of a small spot close to the suture near the
resent species differs from *S. cupreoflava* also in its
rongly punctured prothorax, devoid of an impressed
&c. It also in markings and colour on the upper
ely resembles a form of *S. octo-spilota*, L. & G., from
fers by its dark undersurface, differently formed apex
ss closely punctured prothorax, &c. The combination
inose at apex, prothorax with a yellow border, under-
nly dark, elytra marked with yellow spots, will dis-
is insect from all previously described bearing any
esemblance to it.

the type (in my own collection) was taken near

sp. nov. Sat angusta; sat convexa; sat nitida;
erto adspectu obscure cuprea vel cyanea); prothoracis
us et in elytris singulis signaturis quaternis (sc. macula
scutellum subrotundata, macula marginali elongata
asin, fascia vix antemediana suturam fere attingenti,
ia pone medium suturam haud attingenti) flavis;
(hoc late leviter longitudinaliter concavo) antice sat
minus crebre, postice sat crebre subtilius, punctulato;
ace ad latera haud marginato, quam longiori (et
quam antice) circiter dimidia parte latiori, antice
vix bisinuatim concavo, linea mediana irregulari lævi
to, latitudine majori sat longe pone medium posita,
us sat fortiter rotundatis, basi minus fortiter bisinuata;
punctulato-striatis, interstitiis vix distincte punctu-
ntice subplanatis postice convexis, apice oblique vix
nato, partis subemarginatæ angulo externo spiniformi,
us postice crenulatis; corpore subtus sat longe minus

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dense piloso; sternis fortiter rugulose sat crebre (parte mediana sparsim haud rugulose excepta) punctulatis; prosterno inter coxas sat angusto retrorsum gradatim angustato; segmentis ventralibus 1° 5° que præsertim in medio sat fortiter (fere ut sterna in medio), ceteris antice multo magis crebre subtiliter postice nullomodo, punctulatis; segmento ventrali apicali quam penultimum paullo longiori, postice truncato-vix-emarginato, juxta apicem quam antice haud magis declivi; unguiculis simplicibus. Long., 5½ l.; lat., 2 l.

The possession in combination of the four characters mentioned above as distinguishing *S. Victoriensis* from most of its congeners will also distinguish this present insect from all previously described at all closely resembling it, except *S. Victoriensis*, which is very near it, but from which it differs in being smaller and in the absence of the yellow spot close to the apex of the elytra (it is no doubt uncertain whether either of these characters is constant), as well as in the following structural characters:—On the undersurface the middle piece of the prosternum is narrower even at its front (*i.e.*, at the point immediately before the front of the coxæ where its lateral striæ commence), and thence is very considerably narrowed hindward, so that the lateral striæ conspicuously approximate hindward. This form of prosternum is unusual in this genus, the sides of the middle piece being usually parallel or nearly so; indeed I do not know any very common and widely distributed species in which it is similarly formed; in *S. vittata*, Saund., however, it is very similar but not quite so decidedly narrowed hindward. The intermediate ventral segments in *S. eremita* are much more finely and closely punctured than in *S. Victoriensis*, except at their apical margin where there is a wide impunctate edging. In the example before me the sutural apex of the elytra is not distinctly prominent, whereas it is spiniform in *Victoriensis;* and the general shape offers a further distinction, *S. eremita* being less elongate and cylindric than its ally, and having elytra considerably wider at their post-humeral dilatation than the prothorax, their width at this point being about the same as at the dilatation behind the middle, whereas in *Victoriensis* the elytra at their post-humeral dilatation are considerably narrower than at their hinder dilatation and scarcely wider than the prothorax.

Western Australia, near Eucla; sent to me by Mr. Graham.

S. pallidipennis, sp. nov. Minus angustata; subdepressa; viridis vel nigro-ænea vel igneo-cuprea, elytris abdomineque totis pallide flavis, hoc basi submetallico-micanti; capite sat elongato crebre fortiter punctulato, longitudinaliter late profunde concavo; prothorace quam longiori (et postice quam antice) tribus partibus latiori, creberrime sat fortiter sub-

spere (ad latera vix magis crasse) punctulato, antice vix isinuatim leviter concavo, latitudine majori fere ad basin osita, lateribus vix distincte marginatis subrectis, basi ortiter bisinuata, angulis omnibus acutis; elytris sat fortiter unctulato-striatis, interstitiis punctulatis antice leviter postice gradatim magis fortiter) convexis, lateribus apicem ersus minute denticulatis, apice emarginato leviter bispinoso; orpore subtus confertim sat fortiter (sternis in medio minus rebre exceptis) sat aspere punctulato; segmento ventrali picali quam penultimum paullo longiori, haud aliter punctuto, alterius sexus (?) apice rotundato alterius (?) late vix isinuato; unguiculis simplicibus. Long., $4\frac{1}{2}$—$5\frac{1}{8}$ l.; lat., $\frac{3}{8}$—$1\frac{9}{10}$ l.

lattish rather wide species much narrowed at both ends, nlike *S. mustela-major*, Thoms., in outline save that the f the prothorax are much less rounded; the shape of this nt—narrow in front with sides diverging from the front to the base itself in almost straight lines—is unusual in nus. This character in combination with the colouring—ly of a blackish or metallic colour except the elytra and nen which are entirely pale testaceous—will, I think, dish the present species satisfactorily. I have seen several ples which vary *inter se* only in respect of the darkly ed parts being coppery or green or blackish as the case may

Australia; Port Lincoln district.

wsonensis, sp. nov. Sat lata; minus convexa; sat nitida; ubtus vix pubescens; nigra, elytrorum maculis 4 (sc. macula arva discoidali prope basin posita, alia paullo majori postumerali, alia magna subrotundata vix ante medium posita, lia angusta transversa ante apicem) flavis; capite minus longato, longitudinaliter late sat profunde concavo, sat rebre sat fortiter punctulato; prothorace sat convexo, in nedio late longitudinaliter vix concavo, ante scutellum fovea arva instructo, quam longiori (et postice quam antice) vix lus dimidio latiori, ut *S. guttaticollis* (nihilominus ubique agis subtiliter) punctulato, latitudine majori vix pone nedium posita, lateribus haud marginatis fortiter rotundatis, nargine antico leviter vix sinuatim concavo, angulis posicis rectis, basi fortiter bisinuata; elytris ut *S. guttaticollis* erminatis, punctulato-striatis, interstitiis punctulatis antice ubplanatis postice sat convexis, lateribus postice haud lenticulatis; corpore subtus crebre sat subtiliter (prosterno nagis fortiter subrugulose), in medio vix minus crebre, punctulato; segmento ventrali apicali quam penultimum sat

longiori, postice triangulariter producto; unguiculis simplicibus. Long., 3⅓ l.; lat, 1⅓ l.

The elytra at their posthumeral dilatation are of the same width as at their postmedian dilatation, and a little wider than the greatest width of the prothorax. In the example before me the discoidal yellow spot near the base extends from the third interstice to the fifth inclusive. The posthumeral spot is on the external three interstices; the large, somewhat-rounded spot, with its hinder end at the middle of the elytra, becomes wider from the lateral margin (from which it is separated by one interstice) towards the suture (where it reaches the sutural stria). The sub-apical spot is separated by a single interstice from both suture and lateral margin, and is very narrow and nearly straight. The base of the prothorax is exactly the same width as the base of the elytra.

In order to compare this species with a familiar one I place it beside *S. cruentata*, Kirby, and find that (disregarding colour and markings) it differs chiefly as follows:—It is a little shorter, wider, and less convex; the head is considerably wider between the eyes, the prothorax is more transverse, with more strongly-rounded sides and (though the puncturation scarcely differs otherwise) without a distinct lævigate central line; on the underside it differs chiefly in the prosternum much more closely punctured in the middle, and in the apical-ventral segment being obliquely truncate on either side behind, the two truncate faces meeting in an angle in the middle (this may be sexual).

This species, in the general style of markings, &c., belongs to the most numerous group of this extensive genus, being devoid of markings, except on the elytra, and having these spined at the apex. The nearest to it are probably *S. Kreffti*, Macl., *lilliputana*, Thoms., and *neologa*, Thoms., all of which are described too briefly to indicate differences other than in markings, but they all seem to be differently marked; *Kreffti* has the "subapical fascia" continued along the lateral margin of the elytron, and there becomes of a deep-red colour; *lilliputana* is described as having no markings in the posterior portion of the elytra; *neologa* seems to be a larger insect of blue-green colour, with bright-red markings on the elytra, and without a discoidal spot near the base of the same.

Queensland; Dawson River district; sent to me by Mr. French.

S. trispinosa, Kerremans. There is nothing in the description of this species indicating any distinction from *S. bicincta*, Boisd. It is true the original description of the latter is not sufficiently detailed for its identification, but M. Thomson (Typ. Bupr. App. I., p. 34) has added details (presumably from inspection of the

which show that *S. trispinosa* must at any rate be exces-
close to it.

ubrocincta, Kerremans. This name having been previously
ed by M. Gehin (Bull. Soc. Mosel., 1855, p. 13) for a dif-
species of *Stigmodera*, I propose to substitute *cincta* for
rremans' name.

aticollis, sp. nov. Minus lata; sat convexa; sat nitida;
btus breviter pubescens; supra rubra; capite, prothoracis
acula magna transversa antemediana in medio triangulariter
trorsum producta, scutello, et elytrorum maculis (sc. macula
agna humerali utrinque posita, alia communi postmediana,
ia utrinque postmediana, alia communi quadrata apicali),
aneis; corpore subtus (prosterni lateribus rubris exceptis)
tennis pedibusque cyaneis; capite sat elongato, longitu-
naliter profunde concavo, sat fortiter sat crebre punctulato;
othorace subgibboso, quam longiori (et postice quam antice)
us dimidio latiori, postice in medio sat fortiter minus crebre
ntice gradatim magis subtiliter magis crebre, latera versus
adatim magis rugosule) punctulato, latitudine majori sat
nge pone medium posita, lateribus haud marginatis sat
rtiter rotundatis, margine antico leviter bisinuatim con-
vo, basi fortiter bisinuata, angulis posticis acutissimis
trorsum directis, linea longitudinali lævi mediana fovea
arva postice terminata; elytris apice oblique emarginatis
ncisura intus vix manifeste, extus fortiter, spinosa),
unctulato-striatis, interstitiis sat crebre punctulatis antice
turam versus modice (postice et latus versus fortiter) con-
exis, lateribus postice denticulatis; corpore subtus (sternis
medio exceptis) confertim minus fortiter subaspere punc-
ulato; segmento ventrali apicali quam penultimum paullo
ngiori apice subsinuatim truncato; tibiis anterioribus 4
asi sat fortiter curvatis; unguiculis simplicibus. Long.,
$\frac{1}{2}$ l.; lat., $1\frac{1}{3}$ l.

elytra at their posthumeral dilatation are of the same
as at their post-median dilatation, and very slightly wider
he greatest width of the prothorax. The post-median com-
pot and the two other post-median spots form a transverse
across the elytra. The base of the prothorax is exactly the
width as the base of the elytra.

s species is distinguished from all its congeners except a
group by the following in combination:—Underside (except
of prosternum) of uniform dark colour, prothorax and elytra
markings, elytra spinose at apex; of the few species not
y different in size presenting this combination it seems
st to *S. gibbicollis*, Saund., and *fascigera*, Kerremans; from

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both these it differs entirely in its markings, and also from the former *inter alia* by its prothorax very strongly bisinuate at the base; the description of the latter is hardly detailed enough to specify other differences than of colour and markings. The prothorax in respect of markings is almost exactly like that of *S. Pertyi*, L. & G., without the basal dark mark which is present on the latter. I do not know any other species having the elytra similarly marked.

North Queensland; sent to me by Mr. Duboulay.

S. Lais, Thoms. The author does not quote a more exact habitat than "Australia" for this species. I have specimens certainly I think referable to it from Western Australia.

S. guttata, sp. nov. Sat lata; minus convexa; sat nitida; aureo-viridis, elytris abdomineque (hoc viridi-micanti) testaceis; illis basi summa, maculis parvis postmedianis utrinque 2 latus versus positis, et spinis apicalibus, obscure viridibus; capite sat elongato, longitudinaliter profunde concavo, sat fortiter sat crebre punctulato; prothorace quam longiori dimidio (postice quam antice duplo) latiori, postice in medio fortiter minus crebre (antice gradatim magis subtiliter magis crebre, latera versus gradatim magis rugosule) punctulato, latitudine majori longe pone medium posita, lateribus antice fortiter sinuatis pone medium ampliato-rotundatis, margine antico fortiter concavo in medio anguste producto, basi late sat fortiter lobata, angulis anticis valde acutis posticis rectis, linea longitudinali lævi mediana antice obsoleta postice fovea parva terminata; elytris apice oblique emarginatis bispinosis, punctulato-striatis, striarum punctis fuscis sat magnis, interstitiis minus convexis antice suturam versus sublævibus aliunde obscure punctulatis, lateribus postice denticulatis; sternis ad latera crasse sat crebre inmedio sparsim subtiliter, abdomine confertim subfortiter (processu intercoxali crassius sparsius excepto), punctulatis; segmento ventrali (feminæ ?) apicali quam penultimum sat longiori, postice rotundato; unguiculis simplicibus. Long., 9 l.; lat., $3\frac{3}{4}$ l.

Var. (?) Minor (long., 7 l.); elytris pone scutellum macula communi viridi instructis, macula postmediana utrinque singula.

The type of this species is very like *S. bimaculata*, Saund. (from North-West Australia), as figured (Journ. Linn. Soc. IX., t. 10, fig. 48), if the dark-coloured apex of the elytra were absent from the figure and a second dark spot were added between the spot represented on the elytron and the margin. *S. bimaculata*, however, is described as having a very differently sculptured prothorax (*e.g.*, with an impressed dorsal line, and a fovea near each posterior angle).

of the prothorax of the present species is quite as base of the elytra; these latter are slightly wider at dian than at their posthumeral dilatation, and their forward conspicuously and angularly at a point be-th and sixth punctulate-striæ.

raminea, Macl. (of which I possess a type), *S. guttata alia* in the same respects as from *S. bimaculata*. I here that *S. bimaculata* must be very close to *a*, judging from the figure and description of the h scarcely show any difference from the latter except edian spot on each elytron being nearer the suture ex of the elytra being more strongly spined. *nea*, Macl., and *auricollis*, Thoms., are near the ies; the former is insufficiently described, but has inely punctured" and the elytra devoid of isolated nderside of the latter is entirely metallic green.

lia; Lyndoch Valley, &c.

exus alter (?). Sat angusta; sat convexa; elytris i typici) basi summa (vix manifeste), sutura (hac icem rotundatim dilatata), linea obliqua posthumerali, ula postmediana prope marginem, viridibus; pro- quam longiori (et postice quam antice) vix plus latiori, latitudine majori vix pone medium posita, is sat fortiter rotundatis; elytris basi quam pro- basis sat latioribus, segmento ventrali apicali penultimum haud longiori, apice subsinuato; ceteris *uttatæ*.

trorum notis viridibus plus minus (nec omnino) tibus; nonnullis exemplis cupreis (elytris abdomi- xceptis). Long., 6½ l.; lat., 2½ l.

t occurs in the same localities as *S. guttata*, and bears iking resemblances to that species that in spite of epancies I cannot satisfy myself that the differences an sexual. Each form is extremely variable—indeed, een two examples of either quite identical. The ex- last described form has elytra entirely testaceous suture; another example has the metallic colour of nterrupted in several places and a single metallic spot le behind the middle.

LAMELLICORNES.

BOLBOCERAS.

r, sp. nov. ♂ Piceum; capite prothoraceque fortiter e punctulatis; elytris subtiliter 14-punctulato-striatis, rope marginem magis fortiter impressis; pygidio den-

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sissime hirsuto; tibiis anticis externe obtuse 6-dentatis; clypeo antice cornu porrecto valido minus elongato armato; scutello sat fortiter sat crebre punctulato; prothorace in medio profunde longitudinaliter excavato, partis excavatæ marginibus cornubus 4 armatis (sc. cornu postico mediano brevi erecto, alio antico mediano brevi erecto, alio utrinque majori intus incurvato). Long., 8 l.; lat. $4\frac{2}{5}$ l.

The sides of the clypeus about half way between the eyes and the frontal horn are subtubercularly elevated, and the front external angles of the ocular canthi are also prominent. The excavation on the prothorax is of a shape that defies exact description. It reaches from the horn-like elevation of the front margin hindward about three-quarters the length of the whole segment in the form of an extremely deep canal, which is of somewhat regular form in the lower half of its depth, but above that level it begins to widen out very irregularly, so that in some places it seems to be (on the level of the general surface) nearly twice as wide as in other places; the hinder part is limited by a well-defined keel-like ridge—a production of which forms the horn at the middle of the hind margin of the excavation, and which, instead of turning forward to edge the sides of the excavation, runs on transversely to near the lateral margin of the prothorax. The hinder end of the excavation is deeply cavernous. The puncturation of the general surface is continued within the excavation, where, however, it is less rugulose. The length of the horn on the clypeus is about equal to that of the horn on either side of the prothoracic excavation, and is also about equal to the length of the scutellum from its base to its apex. The surface of the prothorax is uneven even outside the excavation, but there is no indication of the deep fovea near the anterior angles which exists in many species of the genus. The striation of the elytra is very feebly impressed, and some of the striæ are obsolete in some part of their length. This species is not very like any other previously described.

South Australia; taken by Mrs. Richards near Warrina.

STUARINE FORAMINIFERA OF THE PORT ADELAIDE RIVER.

By WALTER HOWCHIN, F.G.S.

[Read August 5, 1890.]

: the Foraminifera have a cosmopolitan distribution, ually unrestricted with regard to depth. Not a few, nd particularly those of a high testaceous development, ted to particular areas. The chief factors that are in limiting the range of certain species are apparently re and varying bathymetrical conditions. The restric- ence of climate on many species offers an absolute their extended migrations; and whilst the limitations n are not so definite as those dependent on surface-tem- et the majority of species are influenced by these con- We have, therefore, to recognise a vertical as well as a al distribution, and, generally speaking, there are distinct zones which carry respectively a foraminiferal is characteristic of the depths in which they are found. t the shallow-water species, there are some which ne so far modified in relation to habitat as to flourish kish water conditions, and in some instances, as, for *rochammina inflata*, *Miliolina fusca* and *Polystomella ctata*, even showing a preference for such positions. er of shallow-water Foraminifera, which may succeed in g themselves in an estuary, will probably depend on the ltness of the water, and this, of course, will be regu- ne variable proportions of sea- and surface-waters that e in different estuaries. The amount of fresh water ind its way into the Port River is no doubt propor- ess than occurs with estuaries where the rain is more and the drainage from the land more direct than is ith the Port River. The latter is, indeed, more of an the sea than an outlet of drainage from the land. cause the condition of the harbour is probably more marine than is usual with estuaries, which may account mparatively large number of species obtained within nd greater robustness of shell-structure than is usual rine examples.

lities dredged were—1. The main passage of the North e situations of *(a)* mid-stream, *(b)* on ground covered

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with seaweed and sponges, *(c)* on mud banks nearer shore. 2. Brackish pools, covered at spring-tides, lining the margin of the river to the north of Birkenhead. 3. Several small creeks tributary to the main stream on the south side of Port Adelaide, near the Pinery.

I must not omit to mention a possible source of error in the enumeration of species supposed to be now living in our estuary, arising from the presence of Post-Tertiary marine deposits, exposed in the banks, and probably forming the bottom of the stream in some places. Some samples brought up by the dredge were quite valueless for the purpose desired, in consequence of the evident mixture of derived material with the recent forms, and a considerable number of species have been discarded from the list from a suspicion that they were from the fossiliferous beds referred to, and are not represented by living forms in the river at the present time. This only applies to the dredgings in the North Arm ; those secured from the brackish pools and the small creeks to the south of Port Adelaide are free from this source of error. But after the most careful examination with a view to the elimination of doubtful occurrences, some on the list may be proved by further investigation to be foreign to the living fauna. It is not improbable that the North Arm has been an inlet for saltwater dating from Post-Tertiary times, and although much diminished in area, and becoming more land-locked with the shallowing of the South Australian littoral, many of the littoral species of Foraminifera may have held their ground in the saltwater lagoons of the flats from a period when the coast-line was much further inland.

Miliolina, *Williamson.*

M. Boueana, d'Orbigny. A small and neatly-formed shell, ornamented by fine longitudinal striæ. Widely distributed in shallow waters of temperate and tropical seas. Moderately common on mud bottoms, North Arm.

M. bicornis, Walker and Jacob. An ornamented shell similar to preceding, but of stouter build and less regular in outline. A few examples taken from seaweed bottom, North Arm. Probably derived.

M. Ferussacii, d'Orbigny. Ornamented, with a few conspicuous longitudinal ridges or costæ on each side of test. A widely-distributed form at moderate depths. Rare on seaweed and mud bottoms, North Arm. The robustness of these shells suggests the probability of their being derived.

M. circularis, Bornemann. A small shell with few, much-inflated segments, and possessing a narrow crescentiform aper-

s form was only noted at three "Challenger" stations, e Edward Isle, Kerguelen and Bass' Strait, all in the Seas, and was dredged at moderate depths. Rather eaweed bottom, North Arm.

otunda, Montfort. A very variable form, more com- an the former, with which it is linked by numerous te varieties. It has a wide distribution in shallow A common form on seaweed bottom; less common on s, North Arm.

nga, Montagu. A cosmopolitan species, and found at It is the commonest form of the genus in the Port ere it is generally distributed, but shows preference for ttoms.

osa, d'Orbigny. A few specimens occur which are very in growth, with crescentiform aperture and prominent may belong to this species. In washings from sea- th Arm, and rare in small creeks near Pinery.

inulum, Linne. Typical specimens of this widely-dis- praminifer are not common in the Port River, its place en by the feebler form, *M. oblonga*. The examples are ur sparingly in all the situations examined, but most on muddy ground.

ns, d'Orbigny. One or two examples taken from sea- nd are doubtful occurrences as living forms.

osa, Karrer. The angles of chambers are marked by wavy costæ. A shallow-water species. The finest of this form obtained on the "Challenger" cruise were Moncœur Island, Bass' Strait. In the Port River the are small and not very characteristic. Only observed -banks, North Arm, where it occurs in considerable

a, Brady. An arenaceous variety of the genus iso- with *M. oblonga*, and is distinctively a brackish water ing in estuaries and pools at the mouth of rivers. It on form in such situations on the British coast. Found in brackish pools covered at high water near Birken- in moderate numbers on sandy bottoms in the small r the Pinery.

loculina) trigonula, Lamarck. Rare, in North Arm.

SPIROLOCULINA, *d'Orbigny*.

ulata, Lamarck. Rare, from seaweed-dredgings. North

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S. limbata, d'Orbigny. A few examples occur in North Arm-dredgings which show a feeble development of limbation in the outer chambers.

S. grata, Terquem. Ornamented with fine longitudinal striæ. A common form in warm and shallow seas. A doubtful occurrence.

CORNUSPIRA, *Schultze.*

C. involvens, Reuss. Small and semi-translucent examples, not uncommon on muddy banks, North Arm.

REOPHAX, *Montfort.*

R. nodulosa, Brady. A long and tapering foraminifer of arenaceous build. Chambers numerous, and of pyriform shape. This is one of the most interesting finds in the present researches, for with one or two exceptions on the coasts of Britain (including the Frith of Clyde and the estuary of the Dee), it has an exclusive deep water record, going down to 2,950 fathoms, and has been dredged from the Arctic and Antarctic seas. The local examples are relatively small, not exceeding one-sixteenth of an inch. In the Port River examples, the chambers are very numerous, in some specimens not less than seventeen, and are more angular and constricted at the sutures than is shown in Mr. Brady's figures. The shape of the chambers is indeed exactly that shown by Mr. Brady's *Reophax guttifera*, whilst the remaining features of the test are those of the species under which I have classed the objects. It would appear therefore that the slight distinctions that separate the two may only depend on local variations and are interchangeable. From Mr. Brady's descriptions I infer that the test, as known to him, was rigid, whilst those obtained from the Port River are flexible, suggestive of a chitinous membrane lining the inner surface of the shell. Moderately common on seaweed ground, and rare on mud bottoms. North Arm.

R. scorpiurus, Montfort. Rare on sandy ground. Pinery Creeks.

R. findens, Parker. A few straight and somewhat coarsely arenaceous foraminifera, having apertures at both ends, have been referred to this species, as well as a rather fine example with bifurcation at each end. Mr. Brady mentions a similar example of double bifurcation. A very rare species, only known hitherto from Gulf St. Lawrence and the estuary of the Dee. Rather scarce on sandy bottoms, Pinery Creeks.

HAPLOPHRAGMIUM, *Reuss.*

sis, Parker. This is one of the most striking and unex- the discoveries made among the estuarine forms. The arsely arenaceous, and in contour is isomorphic with the pecies, *Cristellaria crepidula*. It is a very rare species. dy states ("Challenger Report") that it is peculiar to low water areas of the Northern seas. Its known dis- only comprises three localities, viz., Gaspé Bay, at the the St. Lawrence, 16 faths.; Lievdy Harbour, Disco, d, 5 to 20 faths.; and Deva Bay, Spitzbergen, 7 faths. urrence of so rare a form at a spot very remote from its ange of distribution is of peculiar interest. A few speci- re taken on seaweed bottom, but it is moderately com- mud-banks nearer shore.

glutinans, d'Orb. Spiralline in earlier segments and ar in the later growths. Coarsely arenaceous. Very istributed, but it is more commonly found in deep water shallows. Rather scarce in brackish pool near Birken- d moderately common in small creeks near Pinery on ttoms.

TROCHAMMINA, *Parker* and *Jones.*

lata, Montagu. A species of limited range, and very ristic of shallow and brackish water conditions. It is habiting the estuaries of Britain, and the only "Chal- records are north-east shores of Bay of Biscay and t portion of coast of Spain. This is, therefore, the first this species for the Southern Hemisphere. On seaweed North Arm; brackish pool, Birkenhead; and small creek, ery.

amata, Jones and Parker. The habit of this species is tinctly marine than the preceding, and extends to mode- hs. It has a somewhat wider range of distribution than *a*, although by no means common. Three or four exam- nall size were obtained from the mud-banks, North Arm.

CLAVULINA, *d'Orbigny.*

nmunis, d'Orbigny. A straight and slightly-tapering fer, constructed of fine sand grains. It is not uncommon uth Pacific, occurs on west coast of New Zealand, and the Antarctic ice-sheet. An interesting form in our fauna, as it usually frequents deeper water. Mode- mmon in brackish pool at Birkenhead. Rare in creeks, ery.

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VIRGULINA, *d'Orbigny.*

V. Schreibersiana, Czjzek. A widely-distributed form both as to localities and depths. Rather scarce in North Arm.

BOLIVINA, *d'Orbigny.*

B. punctata, d'Orbigny. Found in all parts of the world, and at all depths. Very common on muddy bottoms, North Arm.

B. textilarioides, Reuss. Shorter than the preceding, with inflated chambers arranged in textularian order. Distribution less general than the preceding, and mostly confined to warm seas at moderate depths. Common on muddy bottoms, North Arm.

B. decussata, Brady. A few examples occur which have apparently intermediate characters of the present species and *B. reticulata*, Hantkin. Many specimens show a regular reticulation—more regular than is the case with *B. reticulata*. Mr. Brady notes the presence of similar intermediate characters in examples dredged between Cape of Good Hope and Kerguelen.

B. tortuosa, Brady. One or two specimens exhibiting a twisted form of growth were obtained from the seaweed bottom, North Arm, and have with some reservation, been classed with this species.

LAGENA, *Walker* and *Boys.*

The *Lagenæ* are amongst the most widely-distributed of the foraminiferal types. As a rule they seem equally at home in hot and cold climates, and at all depths. A few of the species have a more restricted range, which will be noted in specific reference. With two exceptions the following species were found limited to the North Arm; but as they prefer muddy bottoms, and the dredgings in other areas were chiefly on sandy ground, their rarity in the material gathered higher up the stream may have arisen from this cause.

L. lævis, Montagu. Moderately common.

L. clavata, d'Orbigny. Rather scarce.

L. gracillima, Seguenza. The most common form of the genus in the Port River.

L. distoma-margaritifera, Parker and Jones. An ornamented, distomatous foraminifer, which is only known as an Australian species. Two or three examples noted.

L. globosa, Montagu. Rather scarce. Amongst the specimens of this form a duplex example with single orifice occurred.

L. striata, d'Orbigny. A form which is more restricted to shallow water than many of its congeners. Common in North

rare in Pinery Creeks. Several monstrous examples ined in which two and three chambers were united to ctilineal or nodosarian mode of growth.

striata, Williamson. The examples are truncate at base, his way are intermediate with *L. crenata*, Parker and Moderately common.

ginata, Walker and Boys. Rather rare, North Arm ry Creeks.

da, Williamson. Rather scarce.

POLYMORPHINA, *d'Orbigny.*

a, Walker and Jacob. Rather scarce, North Arm.

eolata, Reuss. Rather scarce, North Arm.

usta, Egger. Rare on seaweed ground, North Arm.

DISCORBINA, *Parker* and *Jones.*

scorbinæ have a wide geographical distribution, and are limited to shallow-water conditions.

cularis, Lamarck. Rare in North Arm and small

cea, d'Orbigny. Rare in small creeks near Pinery.

idiata, Jones and Parker. Rare in North Arm.

o, d'Orbigny. Rare in North Arm. Probably derived.

rulata, d'Orbigny. A hemispherical test with strong Rare in North Arm.

TRUNCATULINA, *d'Orbigny.*

tula, Walker and Jacob. Rare in North Arm and reeks.

lgens, Montfort. Rare in North Arm.

ROTALIA. *Lamarck.*

arii, Linné Rare, but occurs in all positions where were taken. Very characteristic of estuarine con-

POLYSTOMELLA, *Lamarck.*

ato-punctata, Fichtel and Moll. This is probably the racteristic estuarine form that exists among the fora- It is found in almost all estuarine lists of species, and kes its way a long distance up stream. It is the com- pecies in the Port River, and occurs on the muddy flats orth Arm in great abundance. It was also found in all situations where foraminifera were noted higher up the

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stream. The specimens show a considerable range not only in size but in the ornamentation dependent on the number of septal lines, sutural punctations, and the variable development of the retral processes. A few examples show very deeply sunken septal lines, giving a crenate feature to the peripheral outline.

P. macella, Fichtel and Moll. A much depressed variety of *P. crispa*, and is the shallow-water and starved condition of the latter species. It is limited to the littoral of the warmer seas. Not so common as the last described species, but is moderately plentiful in association with *P. striato-punctata* on muddy flats of North Arm.

The above list contains fifty-one species, belonging to fifteen genera, of which six species at least may be regarded as doubtful occurrences in the living condition. The fauna, as a whole, is characteristic of shallow water and a temperate climate. Thirty-five of the species identified (which is equal to two-thirds of the whole) are living in British waters, whilst the remaining sixteen species, with one or two exceptions, are known as Australian or sub-tropical species. The objects of greatest interest in the fauna under consideration are the foraminifera with arenaceous tests, of which there are nine species present. I can find no record of the occurrence of *M. fusca*, Brady, beyond the limits of the estuarine waters of Britain. The rare *Trochammina inflata*, also a British estuarine species, occurs in considerable numbers high up the stream, and exhibits precisely the same peculiarities of shell-structure as are found in its congeners in the Northern Hemisphere. The still rarer species, *Haplophragmium cassis*, the geographical distribution of which, as previously known, was limited to a few points on the borders of the Arctic Circle, is not uncommon in some positions in the river. *Reophax nodulosa* is also a characteristic cold water species, living at abyssal depths, where the temperature is low, and reaches its greateat developments in size in Arctic and Antarctic waters. *Reophax findens* is a very rare form, limited to two localities in previous researches, one of which is the Gulf of St. Lawrence, where it was first discovered in association with *H. cassis*. The finding of these very rare forms in company in the Southern Hemisphere, agreeing with a like association in the Northern Hemisphere, is a coincidence as remarkable as it was unexpected. The presence of several Arctic and sub-Arctic species in our local waters supplies matter for speculation as to the possible migration of these and other forms to lower latitudes during a period of greater cold, and, in this way, reaching the southern shores of Australia, where they still maintain a lingering existence.

Genera and Species.	North Arm.		Brackish Pool, Birkenhead.	Small Creeks near Pinery.
	Washings from Seaweed.	Muddy Banks.		
ueana, *d'Orb.*	M.C.	M.C.	—	—
cornis, *W. & J.*	R.	—	—	—
russacii, *d'Orb.*	R.	R.	—	—
rcularis, *Born.*	R.S.	—	—	—
brotunda, *Montf.*	C.	R.S.	—	—
longa, *Montagu*	C.	M.C.	R.S.	M.C.
biosa, *d'Orb.*	R.	—	—	R.
minulum, *Linné*	R.	R.	—	R.
cans, *d'Orb.*	R.	—	—	—
dosa, *Kar.*	—	C.	—	—
sca, *Brady*	—	—	R.S.	M.C.
riloculina) trigonula, *Lam.*	R.	R.	—	—
planulata, *Lam.*	R.	—	—	—
limbata, *d'Orb.*	R.	R.	—	—
grata, *Terq.*	M.C.	R.	—	—
nvolvens, *Reuss*	R.S.	R.	—	—
dulosa, *Brady*	M.C.	R.	—	—
rpiurus, *Montf.*	—	—	—	R.
lens, *Parker*	—	—	—	R.S.
nium cassis, *Parker*	R.	M.C.	—	—
agglutinans, *d'Orb.* ...	—	—	R.S.	M.C.
a inflata, *Montagu*	R.	—	R.S.	R.S.
squamata, *J. & P.* ...	—	R.S.	—	—
mmunis, *d'Orb.*	—	—	M.C.	R.
hreibersiana, *Cz.*	R.	R.S.	—	—
ctata, *d'Orb.*	C.	V.C.	—	—
tilarioides, *Reuss*	M.C.	C.	—	—
ussata, *Brady*	R.	R.S.	—	—
tuosa, *Brady*	R.	—	—	—
, *Montagu*	M.C.	M.C.	—	—
ata, *d'Orb.*	R.S.	R.	—	—
illima, *Seg.*	M.C.	R.S.	—	—
oma-margaritifera, *P. & J.* ..	V.R.	R.	—	—
osa, *Montagu*	R.S.	R.S.	—	—
ta, *d'Orb.*	M.C.	R.S.	—	R.
striata, *Will.*	M.C.	R.	—	—
ginata, *W. & B.*	R.	R.	—	R.
la, *Will.*	R.S.	R.S.	—	—
a lactea, *W. & J.*	R.	R.	—	—
lanceolata, *Reuss*	—	R.S.	—	—
angusta, *Egger*	R.	—	—	—
esicularis, *Lamk.*	R.	R.	—	R.
osacea, *d'Orb.*	—	—	—	R.
imidiata, *J. & P.*	R.	—	—	—
rbo, *d'Orb.*	—	R.	—	—
alvulata, *d'Orb.*	—	R.	—	—
lobatula, *W. & J.*	R.	R.	—	R.
refulgens, *Montf.*	—	R.	—	—
arii, *Linné*	R.	R.	R.	R.
striato-punctata, *F. & M.*	R.S.	V.C.	M.C.	C.
macella, *F. & M.*	R.	C.	—	—

:—V.C., very common; C., common; M.C., moderately common; R.S., R., rare; V.R., very rare.

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Supplemental Notes to the List of Plants, Collected in Central Australia.

(See Part I., pp. 94 *et seq.*)

By Baron Sir F. von Mueller, F.R.S. &c.

[Read October 7, 1890.]

Helipterum Fitzgibboni, *F. v. M.*

West of Eringa and close to Lady Charlotte-Waters; also near the Finke River, Rev. H. Kempe; on Tempe Downs, R. F. Thornton; near the Georgina River, Alfred Henry; on Nullarbor Plains, J. D. Batt; near Mount Moore, Edwin Merrall; at the eastern sources of Swan River, Miss Alice Eaton.

From the Botanic Museum of Melbourne some years ago, under the above systematic name, this plant was distributed, which is dwarf, annual (or at all events flowering from a first year's root), and has broad, linear, bluntish leaves; peduncular elongations of branches are hardly developed. It differs from *H. incanum* in being beset with short glandule-bearing hairlets, in headlets which never attain a large size, in more numerous and more acuminated involucral bracts, the outer of which are dark- or red-brown, ciliolated, and slightly silky, the inner upwards always white, in none of the fruits being attenuated at the summit, and in usually fewer pappus-bristles. Sometimes the involucrating bracts are still more increased on expense of the development of flowers. Horticulturally, this plant is quite distinct from any of the forms of *H. incanum*; nevertheless, it is as yet uncertain, whether it should be regarded as a permanently distinct species or merely as an extreme variety. The broader-leaved form of *H. incanum*, with the usual lanuginous vestiture, penetrates also quite as far as the Tropic of Capricorn into Central Australia, though it is as yet not known from any region of West Australia. In the higher of our Alps, and in many other tracts of country, *H. incanum* produces quite a thick perennial root-stock of considerable length. The whole plant exhales a pleasant, somewhat chamomile-like, odour.

The specific name of this extremely pretty "everlasting" was chosen in honour of E. G. Fitzgibbon, Esq., who for a third of a century has so efficiently held the responsible and onerous office of Town Clerk of Melbourne, and who with genial and enlightened circumspectness has also constantly promoted science-research in the greatest of Southern Cities.

imens of *H. Fitzgibboni* from all the localities men-
emarkably uniform in their characteristics.

ROPIUM FILAGINOIDES, *Bentham*, var. *heteranthum*.

n, seemingly annual; leaves flat, from narrow- to
eolar, as well as the branches and calyces hispidulous;
corollas enlarged, with semi-lanceolar deltoid glabrous
es; nutlets four, rounded-blunt, scabrous.
Lake Amadeus. (Incorrectly recorded as *H. fascicu-*
cisely the same plant near Charlotte-Waters (C. Giles),
ortescue Rivers (J. Forrest).
ged flowers, which measure across the summit fully
f an inch, seem to indicate a dimorphismus. The
filaginoides, which was gathered by Winnecke near
an River, differs from our plant in thicker root,
nous vestiture, corolla much beset with hairlets, and
in always uniform flowers. Should future researches
material require the separation of the plant here re-
the variety name could become specific. In some
eliotropium (for instance *H. ventricosum*) the base of
s gets finally so much drawn upwards at the inner
nder the point of affixion midway-lateral.

ERAGROSTIS TRICHOPHYLLA, *Bentham*.

(in the "Flora Austral," VII., 643) identifies an
from Queensland with the *Poa imbecilla* of New
t is, however, a rather rigid plant, and a genuine
while the real *P. imbecilla*, of Forster (but not of R.
merely re-employed the name for a grass, now re-
leusine Chinensis), comes nearer to *Poa cæspitosa*,
of which are quite as low, thin, and weak as
, but the empty bracts of the latter are smaller, and
upporting bracts less streaked.
chanan's excellent illustration ("Indigenous Grasses
aland," pl. liii.) accord well some specimens from
our collection, except that the five venules of the
rting bracts are shown as more prominent, therefore
a-like.

LESCHENAULTIA STRIATA, *F. v. M.*

e extending to fully one inch. Corolla inside below
et with straight-spreading irregularly seriated white
e two upper lobes linear, acute; the three lower lobes
onsiderably beyond the upper, expanding broadly on
to a bluish venular-striolated imperfectly crisp-cilio-
mewhat crenulated membrane, the three-lined axis of
orter than the expansions.

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On the Discovery of Marine Deposits of Pliocene Age in Australia.

By Professor Ralph Tate, F.G.S., F.L.S., &c.

[Read August 5, 1890.]

Towards the end of last year a deep bore in search of water was successfully completed at the Australian Smelting Company's Works at Dry Creek, Adelaide. A summary of the beds passed through, which here follows, has been furnished me by Mr. John Provis, the Company's General Manager:—

"The bore was commenced with an auger big enough to take an eight-inch tube, and was sunk 120 feet through clay; after 100 feet had been reached, occasionally thin seams of sand occurred which carried a little water. At 120 feet the tube reached the sand, and a good supply of water was struck, estimated at about 30,000 gallons per day. The sand rose so rapidly, however, that it was impossible to keep it out, and the tube was constantly choked. Owing to the bore being suspended as soon as water was struck, the sand and clay packed so tightly round the tube that it was impossible to drive it, and another tube had to be inserted; this was put down a considerable distance further, in a very fine sand, but eventually shared the same fate. As a last resource, a third tube was inserted, and arrangements were made to carry on the work night and day without intermission.

"A little water began to flow below 300 feet. At about 320 feet we came on to the marine shells, and these continued down to about 400 feet. At 400 feet to 410 feet very few shells occurred, and a little clay was mixed with the sand. There were also occasional pebbles of quartzite and schist. At 400 feet water commenced to flow very freely, and at 410 feet the flow increased to a quantity estimated at 100,000 gallons per day, and continues to-day (July 5, 1890) as strong as when first struck. There is also a marked improvement of the quality of water* now flowing."

The site of the bore is about 14 feet above sea-level, and is at the margin of the Recent Marine silts overlapping the red loams of the Adelaide Plain. The upper 120 feet of the bore-section doubtlessly belong to the Pliocene or Mammaliferous Drift, but until the fossiliferous bed at 320 feet was reached I had not

* See Appendix.

re. I am, therefore, unable to express an opinion as
and probable age of the intervening portion of the
over, I had not the opportunity of examining any
ed material. Particular interest, as regards this
ion, belongs to the fossiliferous sands extending in
0 to 410 feet; because, if I have rightly correlated
re brought to light, we have now knowledge of a
of Pliocene age, which partially fills the hiatus
r Older Tertiary series from the Pleistocene and
e formations.

s very sharp and somewhat coarse; it resembles
-crystals, and shows little or no attrition. With it
mingled dark-brown or blackish carbonaceous chips,
longing to stout stalks of sea-weed; the dissolved
hydrogen in the outflowing water may have origi-
rom the chemical action of the decomposing vege-
n the alkaline sulphates, whilst some of the animal
in the form of the ligamental union of bivalve-
preserved in some of the larger species, may have
a like manner. The organic debris consists largely
ll-substance; whilst the more or less perfect shells,
ow no signs of extensive rolling, have lost their
e; though in one species of *Phasianella* traces of
infrequently clearly discernible, though the original
en wholly obliterated. The presence of quartzite-
m 400 to 410 feet would indicate an approach to
e Tertiary series; the pebbles range to about one
ter, and are only slightly eroded.

omprises 10 species of foraminifera, a coral (*Cyclicia*
G.), a few species each of crustacea (*Eliminius*
in, &c.), echinoids (*Goniocidaris*, sp., *Stronglyocen-*
d polyzoa, 60 species of lammellibranchs and 150
The species have been carefully compared with
Tertiary forms belonging to Australasia, and less
with Recent and Tertiary faunas of exotic areas;
ral result that about one-half of the species is pecu-
per cent. common to the Miocene fauna as known
Cove and southward to Aldinga Bay, at Muddy
t the Gippsland Lakes, whilst about 20 per cent.
e recent fauna of Southern Australia. This result
anticipated from a cursory survey of the collection,
strong modern facies, though the majority of the
careful comparison prove to be distinct.

he result of a comparison of the Lamellibranchiate
ose of the Recent and Tertiary Epochs I am able

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to submit, as follows; whilst as regards the Gastropod-fauna, the comparisons are not completed—the magnitude of the task being disproportionately great, though estimated by so much as has been determined, there are fewer species represented in living creation or in older Tertiary deposits, and a larger number peculiar to the fauna.

Table of the Genera of Lamellibranchiata, with the number of their species belonging to the Pliocene.

Family Gastrochænidæ—			Family Carditidæ—		
Humphreyia	...	1	Cardita	...	2
Family Saxicavidæ—			Carditella	...	1
Saxicava	...	1	Family Nuculidæ—		
Family Corbulidæ—			Nucula	...	1
Corbula	...	1	Leda	...	1
Family Anatinidæ—			Family Crassatellidæ—		
Myodora	...	2	Crassatella	...	1
Myochama	...	1	Family Arcidæ—		
Family Mactridæ—			Limopsis	...	1
Mactra	...	1	Pectunculus	...	2
Hemimactra	...	1	Cucullæa	...	1
Family Tellinidæ—			Arca	...	1
Tellina	...	3	Barbatia	...	1
Family Veneridæ—			Family Aviculidæ—		
Chione	...	6	Meleagrina	...	1
Cytherea	...	2	Family Spondylidæ—		
Rupellaria	...	1	Spondylus	...	1
Family Cardiidæ—			Family Limidæ—		
Cardium	...	2	Lima	...	1
Family Lucinidæ—			Limatula	...	1
Lucina	...	7	Family Pectinidæ—		
Divaricella	...	1	Pecten	...	3
Miltha	...	1	Pleuronectes	...	1
Loripes	...	1	Family Anomiidæ—		
Family Erycinidæ—			Placunanomia	...	1
Lepton	...	3	Family Ostreidæ—		
Pythina	...	1	Ostrea	...	1
Mysella	...	1			
Cyamium	...	1	Total species	...	60

TABLE of the DEFINED SPECIES of LAMELLIBRANCHIATA, occurring in the Pliocene Sands, showing their DISTRIBUTION IN TIME within the AUSTRALIAN AREA.

The sign xx before the name indicates that the species is abundant; x that it is not uncommon. The asterisks in the columns showing distribution indicate that the species are characteristic.

		Eocene.	Miocene.	Pleistocene.	Recent.
Humphreyia Strangei, *Adams*	...	.	.	.	x
x Saxicava arctica, *Linn.*	...	x	x	.	x
Corbula ephamilla, *Tate*	...	*	x	.	.
Myodora brevis, *Sow.*	...	x	x	.	x
Mactra Hamiltonensis, *Tate*	...	.	*	.	.

	Eocene.	Miocene.	Pleistocene.	Recent.
a Howchiniana, *Tate* ...	.	x	.	.
nelloides, *Tate*	.	x	.	.
atissima, *Sowerby* ...	.	.	.	x
pinqua, *T.-Woods*, var....	x	x	.	.
roborata, *Tate*	.	*	.	.
ibmultistriata, *Tate* ...	.	x	.	.
pauperita, *Tate*... ...	.	x	.	.
nuicostatum, *Lamk.* ...	.	.	.	x
gnorum, *Desh.*	.	.	.	x
iformis, *Tate*	.	*	.	.
ocomorpha, *Tate* ...	x	.	.	.
iloides, *Tate*	.	x	.	.
is, *Tate*	.	x	.	.
ei, *Angas*...	.	.	.	x
drisulcata, *D'Orb.* ...	.	x	x	x
ulans, *Tate*	.	x	.	.
gonale, *Tate*	.	.	.	x
omala, *Angas*	.	.	.	x
oblonga, *T.-Woods* ...	x	*	.	.
issii, *Menke.*	.	x	.	x
nida, *T.-Woods*	x	*	.	.
elcheri *Adams & Rv.* ...	*	*	x	x
s obliquus, *Reeve* ...	.	.	x	x
convexus, *Tate*, var. ...	.	*	.	.
orioensis, *McCoy* ...	*	x	x	.
ularis, *Brug.*	.	.	.	x
crassicardia, *Tate* ...	x	x	.	.
i, *T.-Woods*	x	.	.	.
effreysiana, *Tate* ...	x	.	.	.
i-australis, *Tate*	.	*	.	.
ndyloides, *Tate*	.	x	.	.
bifrons, *Tate*	.	*	.	.
es lucens, *Tate*	.	x	.	.
nia Ione, *Gray*	.	x	x	x
gasi, *Sowerby*	.	.	x	x
pecies, 40.	12	27	6	16

ry of the distribution of the 60 Pliocene species is as

species	16 or 27 per cent. nearly
t species of the Eocene	
Miocene fauna ...	24
cted Pliocene species	20
Total	60

e Genera of Gasteropoda, with the Number of their Species belonging to the Pliocene :—

oreus) ...	1	Vitularia ...	...	...	1
ebra) ...	2	Trophon ...	...	...	1
acantha) ...	1	Fusus ...	...	...	1
onotus) ...	1	Sipho ...	...	...	1

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Fasciolaria	...	...	2	Odostomia	...	...	2
Triton	...	...	2	Turbonilla	...	...	3
Ricinula	...	...	1	Alaba	...	...	1
Nassa	...	...	3	Lacuna	...	...	1
Cominella	...	...	1	Rissoina	...	...	4
Phos	...	...	1	Rissoia	...	...	3
Voluta	...	...	2	Hydrobia	...	...	2
Ancillaria	...	...	2	Phasianella	...	...	2
Mitra	...	...	3	Eucosmia	...	...	1
Costellaria	...	...	3	Astralium	..	...	2
Columbella	...	...	9	Cyclostrema	...	...	5
Cassis	...	...	1	Teinostoma	...	...	1
Pelicaria	...	...	1	Liotia	...	...	1
Terebra	...	...	1	Cantharidus	...	...	3
Cancellaria	...	...	2	Calliostoma	...	...	1
Marginella	...	...	3	Clanculus	...	...	2
Pleurotoma	...	...	1	Elenchus	...	...	2
Bela	...	...	1	Diloma	...	...	1
Surcula	...	...	1	Solariella	...	...	1
Cithara	...	...	1	Euchelus	...	...	1
Drillia	...	...	1	Haliotis	...	...	1
Clathurella		...	5	Nacella	...	...	1
Cypræa	...	...	1	Fissurellidæa	...	...	1
Crepidula	...	...	2	Fissurella	...	...	1
Trochita	...	...	1	Emarginula	...	...	1
Amalthea	...	...	1	Ringicula	...	...	1
Natica	...	...	5	Tornatella	...	...	2
Sigaretus	...	...	1	Atys	...	...	1
Vermetus	...	...	1	Volvula	...	...	1
Siliquaria	...	...	1	Tornatina	...	...	1
Turritella	...	...	1	Utriculus	...	...	1
Mesalia	...	...	1	Cylichna	...	...	4
Cerithium	...	...	3	Ischnochiton	...	...	1
Campanile	...	...	1	Schizochiton	...	...	1
Bittium	...	...	3	Chitonellus	...	...	1
Triforis	...	...	2	Entalis	.	...	1
Cerithiopsis	...	...	3	Dentalium	...	...	3
Eulima	...	...	1	Cadulus	...	...	1
Syrnola	...	...	3				

Table showing the Vertical Distribution of some Gastropoda occurring in the Pliocene Sands. (Explanations as before).

	Eoc.	Mioc.	Pleist.	Rec.
Nassa Jacksoniana, *Quoy & G.* ...	.	.	.	x
Nassa Tatei, *T. Woods*	*	x	.	.
Cominella subfilicea, *Tate*	.	x	.	.
Triton armatum, *Tate*	x ?	x ?	.	.
xx sexcostatum, *Tate*	.	x	.	.
Ancillaria orycta, *Tate*	.	*	.	.
xx pseudaustralis, *Tate* (dwarfed)	*	.	.	.
Columbella exoptata, *n. sp.*... ...	.	x	.	.
Cassis fimbriatus, *Quoy & G.* ...	.	.	.	x
Pelicaria coronata, *Tate*	.	*	.	.
Cancellaria Wannonensis, *Tate* ...	.	*	.	.
Cypraea Jonesiana, *Tate*	.	x	.	.
Crepidula monoxylon, *Lesson* ...	.	x	x	x
immersa, *Angas*	.	.	.	x

	Eoc.	Mioc.	Pleist.	Rec.
conica, *Lamk.*	.	x	x	x
rantia, *Lamk.*	.	.	.	x
ata, *Hutton*	.	*	.	.
bosa, *Hutton*	.	■	.	.
gittata, *Menke*	.	.	.	x
rovisi, *n. sp.*	.	x	.	.
tenue, *Sow*	.	.	.	x
dubium, *Sow.*	.	.	.	x
irata, *Angas*	.	.	.	x
legantula, *Angas*	.	.	.	x
na micra, *T. Woods* ...	.	.	.	x
gasi, *Crosse*	.	.	.	x
irisodontes, *Quoy & G.* ...	.	.	.	x
Tasmanicus, *T. Woods* ...	.	.	.	x
ævosa, *Reeve*	.	.	.	x
scutella, *Gray*	.	.	.	x
la candida, *Reeve*	.	.	.	x
eumicrus, *Crosse*	.	.	.	x
ostrata, *A. Adams* ...	.	.	.	x
pygmæa, *A. Adams* ...	.	.	.	x
elephantinum, *Lin.* ...	.	.	.	x
octogonum, *Lamk.* ...	.	.	.	x
ctum, *Deshayes*	.	.	.	x
cuminatus, *Deshayes* ...	.	x	.	x

ECIES OF FORAMINIFERA FROM THE DRY CREEK-BORE, determined by Mr. W. Howchin, F.G.S.

ccarii, *Linn.* Common; fine examples.
la crispa, *Linn.* Rather scarce and small.
subnodosa, *Münst.* Common; fine examples, carinate and conspicuously umbonate.
turbo, *D'Orb.* Rather scarce.
rosacea, *D'Orb.* Rather scarce.
na lobatula, *W.* and *J.* Very rare.
erussacii, *D'Orb.* Very rare.
blonga, *Montag.* Very rare.
Triloculina) tricarinata, *D'Orb.* Rare.
bulloides, *D'Orb.* Very rare.

ve are all shallow-water species, and each has been ne or other of the Muddy Creek-beds; but the list is characteristic of the Upper Bed (Miocene) than the cene).—W. H.

already stated that the fauna has a strong modern at the same time it does not materially differ in its ouping from that of our Miocene, which presents so s of contrast with the Eocene. The only genera of erest are *Lacuna* and *Cyamium*, both now known for me as constituents of a Tertiary fauna in Australia, unknown in its recent one. The former belongs to

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the Palæarctic fauna, though well represented in the Parisian Eocene. It is remarkable that it is here represented by a species so closely near to *L. pallidula* as to cause hesitation to inscribe it under a different denomination. One is almost tempted to place it in the same category as *Saxicava arctica*, *Lasaea rubra*, and a few others which are common to the temperate seas of both hemispheres. *Cyamium* is Palæo- and Neo-arctic, though known by one species in the Paris-Basin.

A fact of some significance, suggestive of a colder climate prevailing during this life-epoch, as compared with the Miocene on the one hand and the Recent Period on the other, over the same areas, is the large proportion of diminutive shells, either in regard to the genera to which the species belong, or in regard to identical species of older or recent date. This is very conspicuous in the genera *Columbella*, *Phasianella*, and *Chione*, and exemplified by the species *Corbula ephamilla*, *Arca navicularis*, *Hemimactra Howchiniana*, *Cucullæa Corioensis*, *Ancillaria pseudaustralis*, *Pelicaria coronata*, &c., whilst on the other hand *Saxicava arctica* attains to large dimensions, as in forma *Angasi*.

The fauna is certainly distinct from the Older Miocene, as known at the localities previously named, and is a new one for Australia. In its higher percentage of living species it occupies an intermediate place in the scheme of geological periods between the Miocene and the Recent; and though I provisionally employ the stratigraphical designation of Older Pliocene for it, I am fully aware that the proportion of living species is too low to justify its employment as measured by the European standard; yet in this case the percentage-principle of classification does not adequately express the modern complexus of the whole fauna.

The majority of the living species range from low-water mark to five or six fathoms in depth. Most certainly the fauna belongs to the shallow water. The sharp sands and the fragmentary and unrolled condition of the fossils are rather suggestive of shallow-water material having been swept into a depression of the sea bed, or perhaps indicative of rapid accumulation on a sinking bottom.

The general elevation of the fossiliferous Miocene skirting the east coast of Gulf St. Vincent is about 80 feet above sea level; so that there is a difference of level of about 500 feet between the marine equivalents of the Miocene and Older Pliocene. The Older Pliocene fossil-bed is at from 320 to 410 feet in the Dry Creek bore, which is equal to 306 to 396 feet below sea level, and if we deduct 36 feet as the probable depth at which the species lived, then there has been a general depression of the coast-line

Older Pliocene period of 360 feet. The opinion that it has been thrown by a fault is hardly worthy of con- ; though it is absolutely demanded if the extreme view hat the Dry Creek deposit is synchronous with the the nearest site to which is in the city of Adelaide, five ant, at an elevation of 110 feet above sea-level.

ve estimate of movement closely accords with those n other data, namely, the extension of the Mammalifer- below sea-level, to which I have appealed as some war- the opinion that elevation was a factor in climatic ring the time when glaciers existed in the southern ustralia. The following quotation is significantly ap- —"I am unacquainted with marine Pliocene beds in stralia, or even in Australia, ... therefore the quivalents to the Pliocene [Mammaliferous] Drift, if e submarine." Arguing on the lacustrine origin of the Drift, and its extension below sea-level, as evidence of sion of the land since then, reference is made to the Drift at Port Wakefield extending to 312 feet below and overlying Cambrian or Pre-Cambrian strata; at usta to 356 feet below sea-level (but the base not R. T., in Trans. Roy. Soc., S. Aust., vol.

Appendix.

is of water from the Dry Creek-Bore. By Professor .Sc., &c.

In parts per 100·000.

tal solids dried at 180 deg. C.	321·
ter ignition and restoration of carbonates ...	302·50
dium	83·90
tassium	3·06
lcium	16·28
agnesium	10·85
on	·23
luminium	·21
lica (SiO_2)	2·7
lorine	119·15
lphuric acid (SO_4)	48·45
osphoric acid (PO_4)	*nil*
tal carbon dioxide (CO_2)	40·00
ree or semi-combined CO_2)	16·27
lphurretted hydrogen (SH_2)	·80

* Calculated.

nay conveniently be supposed to be combined as follows, st be clearly understood that such combinations are to a ent arbitrary, there being no known method of ascer-

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taining with certainty how the acids and bases are combined in the original water :—

Parts per 100·000.

Potassium chloride	5·845
Sodium chloride	191·758
Sodium sulphate	26·276
Magnesium sulphate	38·357
Magnesium carbonate... ...	11·126
Calcium carbonate	40·700
Oxide of iron (Fe_2O_3) ...	·335
Alumina	·315
Silica	2·700
	317·407

This takes no account of organic matter, which is present in sufficient quantity to blacken the residue on ignition.

THE STRATIGRAPHICAL RELATIONS OF THE TERTIARY-FORMATIONS ABOUT ADELAIDE, WITH ESPECIAL REFERENCE TO THE CROYDON-BORE.

BY PROFESSOR RALPH TATE, F.G.S., F.L.S., &c.

Plate IV.

[Read October 9, 1890].

Not many weeks since a bore was commenced at Croydon, three and a-half miles from Adelaide; but at the present date operations have been suspended, when a depth of 800 feet was reached. Whether the boring will be resumed is not yet decided on; but it is earnestly hoped, in the interest of geologic science, and to the attainment of the fullest knowledge of the water-bearing capabilities of the formations underlying the Adelaide-plain, that the bore will be extended into the Archæan rocks, which is necessary to ensure a certain measure of finality as regards the scientific as well as the utilitarian aspect of the exploration.

The geological information hereby gained is supplementary to the foregoing communication on the Dry Creek-bore; and because of this it is deemed undesirable to postpone the publication of

on the uncertain chance of the resumption of boring
.

in stratigraphical features, summarised from the boring
kindly furnished by the Conservator for Water, and
appended), are introduced in the accompanying section,
., which represents in the fullest manner the strati-
relationships of the various formations of the Tertiary
South Australia; the eastern part of the section has
een published, Trans. Roy. Soc., S. Aust., vol. V., pl. 1,
2, and is here added for the sake of completeness. The
ows that the Old Tertiaries (Eocene and Miocene),
g the City of Adelaide, crown a steep escarpment of
rocks, against which have been deposited in succession
e beds of the Older Pliocene and the Mammaliferous
ilst at Port Adelaide, recent marine deposits margined
lunes, resting unconformably on the Mammaliferous
rk a post-tertiary shore-line; and finally modern sand-
the present shore.

tion affords clear evidence of a time-interval between
ne and Older Pliocene; and induces me to remark that
udy of "erosive surfaces" among our Tertiary beds will
igh value in determining their relative ages and check
usions drawn from palæontological data alone. The
e diversity of sedimental conditions and concurrent
anges within the same geologic basin may lead us to
conclusions if we do not admit that palæontology is
lly on stratigraphy.

perposition of the dissimilar Miocene-fauna on the
in most localities unaccompanied by any visible strati-
break; feebly so, however, at Muddy Creek, but in
the palæontological conclusions led up to the recogni-
interruption in the succession of deposits. However,
graphical break is most pronounced in the maritime
mid-southern Gippsland, where the Miocene-beds are
n juxtaposition with Eocene-strata, which rise to much
ltitudes—a relationship analogous with that of the
nd Older Tertiaries at Adelaide as exhibited in the
ection.

l the grander groups, Eocene, Miocene, Older Pliocene,
ocene, are separable on stratigraphical data; and when
obscured or not determinable, then our knowledge of
of each, when sufficiently varied and well-developed,
le us to identify geological horizons within the same
basin or probably in contiguous ones.

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Mammaliferous Drift.

At several localities, within two and three miles of Croydon, the clayey loams and associated gravels that form the more superficial deposits of this horizon have yielded species of extinct Mammalia—of *Diprotodon*, *Palorchestes Azael*, *Phascolomys*, &c.

At about the position indicated on the Section, carbonaceous debris was obtained, some years ago, at a depth of 50 feet; on this bare fact, an appeal is made to speculators to invest capital in a search for coal at this place. The comparatively recent geological age of the Mammaliferous Drift had been early proved by me by the discovery of chalky limestone-pebbles, containing the Eocene-species, *Turritella Aldingæ*, in the loams forming the cliffy banks of the River Torrens near the present Weir, whilst later discoveries of mammalian debris in the same deposit have settled the relative position of this geological horizon. Having in view the age of the deposit, its limited vertical depth, and its restricted area on the east, as made certain by the data derived from the Croydon-bore, there seems to me very little hope of any useful purpose to be served by sinking in it in search of coal, unless it be to supply the exact position of boundary-lines between the successive formations, instead of the conjectural ones of my section.

The details of the nearly 400 feet of Mammaliferous Drift passed through in the Croydon-bore are appended. The base of the formation has been fixed at the first marine bed, though a higher position may have been selected on lithogical considerations; seeing that the main mass of the Older Pliocene consists of sharp sands and those at 380 feet closely resemble an Æolian formation, it may be questionable if the beds from 350 to 395 feet should not be included in the Older Pliocene.

Older Pliocene.

The Croydon-section supplies very detailed information as to the thickness and nature of the beds passed through; the official record I have in part revised, as the outcome of a careful examination of the material submitted to me. In these particulars, the Dry Creek-bore was deficient, though on the other hand the palæontological data furnished by the Croydon-bore are meagre, probably because of the very much less quantity of material available. Nevertheless the small collection of fossils, which has been gathered, proves that the Dry Creek shell-bed was reached in the Croydon-bore at about the same horizon, 340 feet below sea-level.

Some species additional to those obtained from the Dry Creek-bore occur, but they do not affect the general palæontological

conclusions previously arrived at. It seems needless to furnish a list of the species, as I hope at an early date to examine exhaustively and report upon the fauna as a whole.

Below the chief shell-deposit, from 395 to 450 feet, species of mollusca prove to be rare and in a fragmental condition. The few forms which seem largely to make up the more calcareous portions, included within the depths of 605 and 738 feet, afford no very trustworthy index to age, of these *Ditrypa Wormbetensis*, McCoy, which is the most abundant, has hitherto been known to me only from undoubted Eocene-beds, but as it is associated in the higher levels of the Croydon-bore with some determinable fragments of the characteristic mollusca of this formation, it must be conceded that this dentaloid annelid is a survival from Eocene times.

The great thickness of the Older Pliocene, 406 feet at the least, is unexpected, as I had conjectured that its base was near-approached in the Dry Creek-bore at a level corresponding with the superior beds only passed through in the Croydon-bore; but admitting the correctness of the assumption, then, the new facts simply indicate a great inequality of the floor on which the Older Pliocene deposits have accumulated.

SECTION OF THE STRATA PASSED THROUGH BY THE CROYDON-BORE.

"MAMMALIFEROUS DRIFT."

Depth in feet below surface (56ft. above sea-level).	Nature of strata.	Remarks.
to 10	Brown clayey loams.	
10 " 18·5	Brown clay.	
18·5 to 19	Brown sandy clay.	
19 " 45	Brown clay.	
45 " 57	Coarse quartzose sand and gravel.	
57 " 75	Clay and gravel.	
75 " 95	Brown clay.	
95 " 110	Clay with limestone-nodules.	
110 " 212	Brown clay.	
212 " 215	Grey clay.	
215 " 235	Clay and quartz gravel.	Water at 215ft. rising to 30ft.
235 " 260	Yellow clay and sand.	Water at 245ft. from surface
260 " 295	Brown clay.	
295 " 315	Brown clay and quartz-gravel.	
315 " 320	Brown clay.	
320 " 325	Brown sand.	
325 " 330	Brown clay.	
330 " 350	Light-brown sandy clay.	
350 " 378	Yellow sand.	
378 " 382	Yellow sand with calciferous lumps.	
382 " 385	Light-grey sharp sand.	
385 " 395	Greenish-grey and brown clay.	

"OLDER PLIOCENE."

Depth in feet below surface (56ft. below sea-level).	Nature of strata.	Remarks.
395 " 415	Grey sharp sand, with small angular gravel and shell-chips	*Ostrea Angasi*, *Pectunculus obliquus*, *P. convexus*, *Limopsis Belcheri*, *Crassatella oblonga*, *Mesalia Provisi*, *Cassis fimbriatus*; *Orbitolites complanatus*.
415 " 416	Hard blue calcareous sandstone, with shells.	
416 " 430	Grey sharp sand, with shell-chips.	
430 " 435	Greyish-brown sharp sand, with small shell-fragments.	*Pectunculus obliquus*. Small gastropods.
435 " 450	White, medium-grained, fairly well-rounded sand, mixed with sharp shell-debris.	Only small mollusca entire, some with colour; *Layanum*; *Orbitolites*, abundant.
450 " 455	Black and grey, fine sand; shell-chips rare.	*Ostrea Angasi*.
455 " 470	Grey sharp sand, with small angular gravel and shell-chips.	*Carditta Preissi*, *Cucullæa Corioensis*, *Limopsis Belcheri*, *Lucina quadrinulcata*, *Ostrea Angasi*, *Pelicaria Mesalia Provisi*; *Cassis fimbriatus*, *Crassatella oblonga*, *Meleagrina crassicardia*
470 " 500	White sharp sand, with small sharp gravel and broken shells	
500 " 520	Greyish-brown sharp sand, with small shell-fragments.	
520 to 525	Shelly gravel, with white sand.	Fragments of large *Celleporæ* abundant.
525 " 550	Very fine grey sand; shelly chips very rare.	
550 " 570	Fine, grey, sharp sand, with some shell-debris.	*Ostrea*, *Spondylus*, *polyzoa*; *Ditrypa* (*common*).
570 " 572	Fine grey sand-rock, with much comminuted shell-debris.	*Natica balteata*, *Corbula ephamilla*, *Ostrea Angasi*, *Ditrypa*, *Echinus*.
572 " 595	Very fine grey sand.	
595 " 605	Fine grey sand and sand rock and shelly fragments.	*Ostrea*, *Cucullæa*, *Pecten antiaustralis*, *P. spondyloides*, *Lucina quadrinulcata*, *Siliquaria*, *Turritella*, *Ditrypa*, *Echinus*, *Layanum*.
605 " 655	Yellow gritty calcareous sand.	Water at 630ft., rising to 20ft. from surface.
655 " 720	Yellowish-grey calciferous sand and sand-rock.	Foraminifera; fragments of polyzoa, echinoids and *Ditrypa*.
720 " 795	Very tenacious blue clay, with foraminifera and small nests of iron-pyrites.	
795 " 800	Sandstone.	

The Gastropods of the Older Tertiary of Australia. (Part III.)*

By Professor Ralph Tate, F.G.S., F.L.S.

[Read October 7, 1890.]

FAMILY TRICHOTROPIDÆ.

The ten species of this family forming part of the Eocene fauna of Australia are all congeneric; but I am uncertain as to their correct location—whether with the type genus or with *Mesostoma*.

Mesostoma was defined by Deshayes in 1864, and included in it four species from the Parisian Eocene; the genus was referred to the Family Rissoidæ. In my Appendix to Woodward's Manual of the Mollusca, 1867, I ventured to transfer it to the Family Cerithiidæ, in which arrangement I am followed by Tryon in his Systematic Conchology, 1883. In my "Census of the Fauna of the Older Tertiary of Australia," Roy. Soc., N.S. Wales, October 3, 1888, I referred our species to "*Mesostoma* (if distinct from *Trichotropis*)," and was disposed to regard *Trichotropis inornata*, Hutton, recent and fossil in New Zealand, as congeneric therewith. Dall, in his Report of the "Blake" Mollusca, Part II., June, 1889, places *Mesostoma* as a subgenus under *Trichotropis*, without, however, indicating the differential characters; but remarks that "the degree of affinity which *Mesostoma*, *Dolophanes*, &c., bear to the original type of the family yet remains to be determined."

So far as my own investigations permit me to form an opinion, I fail to appreciate any differences of generic value, from a conchological point of view, between *Trichotropis* and *Mesostoma*.

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* In the natural sequence of the families, Marginellidæ, Columbellidæ, and Pleurotomidæ should have formed part of this or the preceding fasciculus; but because of the difficulty experienced in correctly illustrating the species of the first two families, which are for the most part small or minute, their inclusion has for the present been abandoned. In respect of the Family Pleurotomidæ, the cause of their temporary exclusion is want of leisure to elaborate the very numerous species (not less than 60) of this perplexing group.

Eleven species of *Marginella* have been described, though not figured; of *Columbella*, represented by about 26 species, very few are diagnostically known; but of Pleurotomidæ about 20 have been described, and about half of them figured.

The plates to illustrate this communication are unavoidably postponed.

The family is represented by 24 living species, two of which antedate to Pliocene times; by 15 Eocene species, 4 of the Paris-basin, 1 from Alabama, and 10 herein described.

Genus Trichotropis.

SYNOPSIS OF SPECIES.

Spire-whorls medially angulated. 1. *T. angulifera.*
Spire-whorls flattened or sloping behind.
Costated, liræ crenulated; outer lip lirate. 2. *T. tabulata.*
Transverse and spiral ornament of fine threads. 3. *T. subquadrata.*
Spire-whorls rounded.
Spirally lirate, transverse ornament not prominent.
Liræ 3, pullus lirate; outer lip sulcate within. 4. *T. triplicata.*
Liræ 5, pullus smooth; outer lip smooth within.
Whorls rapidly increasing, liræ equal. 5. *T. accrescens.*
Whorls slowly increasing, medium lira prominent. 6. *T. quinquelirata.*
Liræ 10 or more, pullus and outer lip lirate.
Liræ equal. 7. *T. apicilirata.*
Liræ alternately stout and slender. 8. *T. interlineata.*
Spirally lirate and conspicuously costate.
Liræ many slender, pullus obscurely lirate. 9. *T. costata.*
Liræ 4 prominent, pullus lirate. 10. *T. fenestrata.*

The species may be arranged into two sections, according to whether the embryonic whorls be ornamented or not. Section I., in which the embryonic whorls are lirate, contains *tabulata*, *subquadrata*, *triplicata*, *apicilirata*, *interlineata*, *costata*, *fenestrata*; Section II., with smooth embryonic whorls, includes *angulifera*, *accrescens*, and *quinquelirata*. There are no close alliances with Parisian species, though *T. triplicata* presents some analogy with *Mesostoma grata*, Desh., and *T. angulifera* has a distant resemblance to *M. angulata*, Desh.

1. Trichotropis angulifera, *spec. nov.*

Shell minute, thin, slenderly fusiform, imperforate. Whorls six; spire elevated, ending in a prominent obtuse apex consisting of two smooth whorls, the first of which is relatively small subglobose, with tip centrally immersed.

Spire-whorls three, medially angulated, the periphery defined by a broad flat rib, between which and the anterior suture are

two equal and equidistant narrow flat liræ; the posterior slope is spirally striated, with or without an inconspicuous medial thread; the whole surface is traversed by close-set sigmoid striæ of growth, and at regular distant intervals by raised threads, which produce slight denticulations as they pass over the peripheral angulation.

Last whorl truncatedly carinated at the periphery; its posterior slope is transversely close-striated and feebly costated (costulæ about 12), and further ornamented by one or two slender, more or less medial, spiral threads; the base has about six encircling flat threads, separated by about equally wide sulci, crossed by close-set striæ.

Aperture acutely oval, channelled in front; outer lip thin, smooth within; columella-pillar very prominent, arched; inner lip slightly reflected near the front.

Dimensions.—Length, 4·0; greatest breadth, 2·0; height of aperture, 1·75.

Locality.—Eocene; glauconitic clayey sands, Adelaide-bore (2 exs.).

2. Trichotropis tabulata, *spec. nov.*

Shell small, thin, broadly fusiform, imperforate; whorls six and a-half; spire conical, scalar, ending in a blunt apex of two and a-half lirate whorls, the first of which is relatively very small.

Spire-whorls three, of rather rapidly-increasing width, with a flattish shoulder and angled in the posterior two-thirds, anterior to which they are convex; the suture is deep. The spiral ornamentation consists of two equal and equidistant threads on the posterior area; and of four elevated, equal, equidistant and somewhat undulose threads, crenulated on the edge, which occupy the anterior convex area; the posterior lira forms the peripheral angulation; on the anterior whorls a more or less slender thread is interposed between the third and fourth. The transverse ornamentation consists of broad subacute costa-like folds on the front of each whorl (about 15 on the penultimate), continued very obliquely to the posterior suture as depressed undulations; and of rather distant coincident striæ of growth, which produce crenatures as they pass across the liræ.

The body-whorl is broad and short, rather tumid, with a rounded convex base, which contracts rapidly into a very short triangular beak. The ornamentation is like that of the spire-whorls, except that there are several threads (seven or eight) on the posterior slope, and that the convex medial area has a slender thread alternating with the liræ; the base is ornamented with concentric threads alternately large and small.

Aperture rhomboid-oval, shortly channelled in front; outer lip thin, strongly lirate within; inner lip reflected, nearly covering the umbilical chink.

Dimensions.—Length, 7·0; greatest width, 4·0; height of aperture, 3·0.

Locality.—Eocene; glauconitic clayey sands, Adelaide-bore (6 exs.).

3. Trichotropis subquadrata, *spec. nov.*

Shell small, thin, fusiform, subumbilicated; whorls five; spire conical, rather high, scalar, ending in a blunt apex of two lirate whorls, the first one of which is relatively small.

Spire-whorls two, with a sloping shoulder and angled postmedially, anterior to which they are slightly convex. The spiral ornamentation consists of four slender subacute threads on the posterior area, of four stouter equidistant threads on the anterior area, sometimes with a supplemental one in front of the posterior thread, which is at the peripheral angulation. The transverse ornamentation consists of oblique thread-like costulæ, with two or three finer threads in the interspaces; the intersections of the spiral and transverse threads produce a very conspicuous and regular tessellated ornament.

The body-whorl is broad and short, rather tumid, with an anterior and posterior angulation, between which it is slightly convex; the base is flatly convex, and contracts very rapidly. The spiral ornament consists of four threads above, six stouter ones in the median portion and three on the base; the transverse ornament consists of slender costulæ, which are directed backwards on the posterior area, incurved on the median area and ecurved on the base; the liræ are slightly denticulated at their intersection with the costulæ; the interspaces are traversed by two coincident raised lines.

The aperture is rhomboid-rotund, inconspicuously channelled at the front; the outer lip is thin on the edge and smooth within; the inner lip is medially incurved, slightly reflected, but not concealing the long narrow umbilical chink.

Dimensions.—Length, 3·5; greatest width, 2·8; height of aperture, 1·5.

Locality.—Lower beds (Eocene) at Muddy Creek (4 exs.).

This species, which is founded on what are probably immature specimens, has a general resemblance to *T. tabulata*, from which it differs conspicuously in its neat tessellated ornament.

4. Trichotropis triplicata, *spec. nov.*

Shell small, thin, imperforate; whorls four and a-half, convex; spire short, conical, ending in a blunt apex of two lirate whorls.

Spire-whorls convex with three strong, equal, equi-distant, truncated liræ, with a fourth partially concealed at the anterior suture, crossed by arched costulæ which produce slight nodulations on the liræ, and by lamellæ of growth two or three in each

nterspace, the lamellæ appear as slight subimbricating squamæ n the liræ.

Body-whorl short and broad, ornamented with four strong liræ nd otherwise as the spire-whorls; the base is abruptly contracted, latly convex and ornamented with four concentric threads, the wo outer ones distantly separated, the two inner ones approxinate. Aperture quadrately rotund, attenuated in front to a light channel; outer lip thin, crenulated on the edge and deeply ulcated within corresponding with the external liræ. Columella lightly arcuate, with the inner lip reflected and almost concealing he umbilical chink.

Dimensions.—Length, 3·5; greatest width, 2; height of aperure, 1·5.

Locality.—Eocene; glauconitic clayey sands, Adelaide-bore 1 ex.).

5. Trichotropis accrescens, *spec. nov.*

Shell of moderate size, imperforate, whorls seven, convex, nuch narrowed at the sutures; spire elevated, ending in a blunt apex of one and a-half smooth inflated whorls.

Spire-whorls convex, rapidly increasing in width, with five trong equal and equidistant elevated truncated liræ, with a ixth partially concealed at the anterior suture; crossed by stout, rched threads, about equal in breadth to the interstitial angular urrows, about 10 in a breadth of 1 mm. on the penultimate whorl.

Last whorl convex, gradually contracted at the base into a very short beak, ornamented with about 10 raised truncated hreads and transversely by arcuate striæ. Aperture quadrately ounded; outer lip thin, smooth within; columella nearly traight, inner lip reflected, almost concealing the umbilical hink.

Dimensions.—Length, 11·5; greatest breadth, 5·5; height of aperture, 4·5.

Locality.—Lower beds (Eocene) at Muddy Creek (2 exs.).

6. Trichotropis quinquelirata, *spec. nov.*

Shell of moderate size, rather thick, turriculate, imperforate; whorls seven, convex, of slow increase, medially subangulated, ending in a blunt apex of two smooth convex whorls.

Spire-whorls four; spirally ornamented with five equidistant, raised, truncated liræ, the medial one is stouter than the others and forms a subangulated periphery; transversely ornamented by fine, close-set, regular, slightly oblique striæ.

Body-whorl narrow and long, rapidly but not abruptly narrowed at the base; ornamented with about 12 truncated cingula,

separated by one and a-half to two times wider, flat, transversely striated furrows.

Aperture roundly oval, channelled at the front; outer lip smooth within; columella slightly arched, inner lip reflected, quite concealing the umbilical chink.

Dimensions.—Length, 6·5; greatest width, 3·0; height of aperture, 2.

Locality.—Eocene; glauconitic calciferous sand-rock, Bird-rock Bluff, Spring Creek, near Geelong (1 ex.).

7. Trichotropis apicilirata, *spec. nov.*

Shell of moderate size, rather thin, turriculate, imperforate; whorls seven and a-half, of gradual increase, convex or medially subangulated, ending in a subacute apex of two and a-half, small, convex, lirate whorls.

Spire-whorls four; the spiral ornament consists of about ten narrow threads, five on the posterior area are unequal and irregularly disposed, the four on the front are stouter, equal and equidistant, the posterior one of which forms a slight angulation, especially on the posterior whorls; the transverse ornament consists of oblique equidistant threads producing a rhomboidal tessellation by intersection with the spirals which are slightly crenulated.

Body-whorl rounded with six irregular spirals on the posterior slope, five prominent ones on the medial area, and five irregular ones on the short, flattish, subangulated base; the whole surface crossed by sigmoid threads.

Aperture rotund, channelled in front; outer lip thin; columella nearly straight, inner lip reflected.

Dimensions.—Length, 9·75; greatest breadth, 4·5; height of aperture, 3·0.

Localities.—Bird Rock Bluff, Spring Creek; blue clays Schnapper Point (2 exs.).

8. Trichotropis interlineata, *spec. nov.*

Shell of moderate size, rather thick, turriculate; whorls convex spirally lirate and transversely closely striated, embryonic whorls lirate.

Spire-whorls three, convex, slightly flattened at the posterior suture: spirally ornamented with about 12 liræ, alternately large and small, which are minutely serrated by regular, close-set, oblique striæ.

Body-whorl convex, rather tumid, with a regularly convex base; ornamented with subacute spiral threads, alternately large and small, crossed by arched striæ.

Aperture rotund, rather broadly channelled at the front; outer

lip lirate within; columella concave behind, a little twisted towards the front, inner lip reflected, almost concealing the umbilical chink.

Dimensions.—Length, 7·0; greatest breadth, 4·0; height of last whorl, 2·5 nearly.

Locality.—Eocene; glauconitic sands, Adelaide-bore (3 exs.).

9. Trichotropis costata, *spec. nov.*

Shell of moderate size, thin; whorls of rather rapidly increasing width; spire broadly conical, ending in an obtuse apex of two and a-half obsoletely trilirate whorls.

Spire-whorls two, medially subangulated; spiral ornamentation of three slender rounded threads on the posterior slope, and about six alternately large and small anterior to the peripheral angulation; the transverse ornamentation consists of oblique convex costæ, narrower than the convex interspaces, and of regular striations, which produce the appearance of fine punctations in the spiral furrows.

Body-whorl convex, a little tumid, subangulated at the base, ornamented with minutely serrated liræ, alternately large and small, about eight on the posterior slope, about twelve above the basal angulation, and about ten on the base. The transverse ornamentation consists of about ten arched costations, which are evanescent at the basal angulation, and of coincident striæ.

Aperture rotund, obliquely channelled at the front; outer lip obscurely lirate within; columella-lip reflected, almost concealing the umbilical chink.

Dimensions.—Length, 5·0; greatest breadth, 3·0; height of aperture, 2·0. A fragment has a diameter of last whorl of 4·5.

Locality.—Eocene; glauconitic sands, Adelaide-bore (4 exs.).

10. Trichotropis fenestrata, *spec. nov.*

Shell small, thin, turriculate; whorls five, of slow increase, separated by a channelled suture, terminating in a blunt apex of two convex lirate whorls, the tip relatively very small.

Spire-whorls two, moderately convex, ornamented with four equal, equidistant, very prominent liræ, crossed by equal, equidistant, straight costulæ of about equal strength to the liræ; the rectangular intercostal spaces with about three or four transverse threadlets. The intersections of the liræ and costulæ are more or less denticulated.

Body-whorl regularly convex, high and narrow, encircled with about twelve principal liræ, with an intermediate threadlet between the medial liræ; the costulæ are acute, separated by broad hallowed interspaces, about fifteen in number, the anterior ones of which are continued on to the base; the intercostal spaces with from four to five coincident threadlets.

Aperture roundly-oval, channelled at the front; outer lip smooth within; columella-reflection concealing the umbilical chink.

Dimensions—Length, 3·75; greatest breadth, 2; height of aperture, about 1·0.

Locality.—Eocene; glauconitic sands, Adelaide-bore (2 exs.).

FAMILY SEQUENZIIDÆ.

Genus Sequenzia, *Jeffreys* (1876).

The genus includes certain small trochiform shells, thinly nacreous, with an infra-sutural sinus resembling that of some Pleurotomiidæ, a sharp and shallow sinus at the periphery, and a third, more open, at the base; the columella is more or less twisted, with an anterior tooth-like projection; the base is either deeply umbilicated or imperforate. Eight species are known from off Pernambuco, and in tropical and subtropical latitudes on both sides of the North Atlantic at depths ranging from 100 to 1,500 fathoms. One of the living species occurs in the Upper Miocene of Calabria and in the Middle Pliocene of Sicily.

The author of the genus placed it near *Solarium*. Tryon in his Manual of Conchology (1883) includes it among Pleurotomariidæ in the vicinity of *Scissurella*. It forms part of Tryon's Monograph of the Family Trichotropidæ. Prof. Verrill removed it, on anatomical characters, far from its former assigned positions, and made it the type of a distinct family. Watson, Challenger Rep. Gastr. (1886), retains it among the Trochiidæ. Dall, Blake Rep. Gastr. (1890), follows Verrill, and places the family in the neighbourhood of Trichotropidæ.

The presence of the genus in the Older Tertiary deposits of Australia was notified by me in Proc. Roy. Soc. N.S.W., 1888, pp. 243, 249; it is represented by a single species which differs from all others by the crenulated margin to the umbilicus and by the bisinuated base of the aperture, as well as by the strongly developed radial ornamentation.

Sequenzia radialis, *spec. nov.*

Shell small, thin; broadly conical; flat and sharply angulated at the base, perspectively umbilicated; ornamented by radial sigmoidal threads, latticed by spiral ones.

Whorls seven, those of the spire flat, with the peripheral angulation exsert, or varying to biangulated, ornamented by equal, equidistant, sigmoid and radial lamelliform threads, and above the peripheral angulation by about four equal equidistant spiral threads, the intersections producing square- to rhomboid- interspaces. The radial lamellæ are more or less continuous from

whorl to whorl, and the suture is consequently usually concealed; there are about 10 in 1 millimetre-space on the penultimate whorl.

Body-whorl with about five spiral threads crossed by the radial lamellæ above the periphery; the peripheral angulation is formed of two approximate large exsert threads, with a small thread on the outside of each. The base is flat, with eight encircling threads, the first two or three narrower than the sulci, the others crowded; the whole surface tessellated by radial threads. The umbilicus is wide and perspective, margined by about sixteen stout granulations, from which proceed the radial threads in twos and threes.

Aperture rhomboid, peristome completed by a thin nacreous growth. Outer lip roundly insinuated near the suture between the first and third spiral threads; sharply and shortly notched at the posterior carina; at the exterior of the base roundly insinuated, separated by a similar sinus at the inner angle by a tubercle corresponding with umbilical carina.

Columella oblique, thickly rounded and slightly reverted on the edge, with a broad deep sinus above; a strong twisted projection tooth at about two-thirds of its length, below which is the inner basal sinus.

Dimensions.—Height, 2·75; greatest breadth, 3·00; height of aperture, 1·25.

Locality.—Eocene at Muddy Creek (9 examples).

This species is simulated by an undescribed *Basilissa* of the Family Trochiidæ, obtained from the Eocene sands in the Adelaide-bore; the latter is generically distinguished by its thick nacreous test, by the absence of the sharp tooth of the columella, and has only a sutural sinus.

FAMILY CONIDÆ.

Genus Conus.

SYNOPSIS OF SPECIES.

Spire flat, or nearly so.
- Pullus small.
  - No spiral ornament; pullus acute. 1. *C. cuspidatus.*
  - Spiral threads, wavy-wrinkled transversely. 2. *C. ptychodermis.*
  - Spiral rows of flat granules. 3. *C. complicatus.*
  - Spiral linear-grooved. 6. *C. heterospira*, var.
- Pullus large, obtuse; body-whorl more or less spirally striated. 4. *C. pullulescens.*

Spire short, scalar.
Peripheral angle margined; posterior slope flat or concave. 5. *C. ligatus.*
Peripheral angle not margined; shoulder sloping backwards. 6. *C. heterospira.*
Spire moderate, with an uninterrupted slope.
Suture of spire-whorls crenulated; body-whorl smooth. 7. *C. Ralphii.*
Suture concealed; body-whorl with spiral rows of granules. 8. *C. acrotholoides.*
Spire moderate, the whorls slightly angulated.
Pullus small, subacute, the tip obliquely immersed.
Body-whorl spirally sulcate; posterior spire-whorls crenulated at the keel. 9. *C. extenuatus.*
Body-whorl smooth or obsoletely lirate; anterior whorls nodulose at the keel. 10. *C. Hamiltonensis.*
Pullus subcylindrical, obtuse. 11. *C. Murravianus.*
Spire elongate; outer lip broadly sinuous, anal sinus deep and oblique (CONORBIS). 12. *C. atractoides.*

SPECIES EXCLUDED AND SYNONYMIC.

C. Traillii, Hutton. The published occurrences of this species in Australia refer to *C. Murravianus* and *C. ligatus.*

C. papillosus, Tate (ms.). The name being preoccupied *cuspidatus* is herein substituted.

C. scalaris, Tate (ms.). The name being preoccupied *ligatus* is herein substituted.

1. Conus cuspidatus, *spec. nov.*

Shell conoidal, about twice as long as wide, with a flat or very low spire; spirally fine-ribbed on the spire and at the base, otherwise usually smooth.

Spire consisting of seven whorls separated by a well-defined, impressed, linear suture with rudely crenate margins; ornamented spirally by flatly-rounded unequally-sized threads (usually about nine on the penultimate whorl), varying somewhat in thickness, but usually as wide as the interstitial furrows, crossed by incurved growth-lines.

The spire terminates in a slender, pyramidal, acutely-pointed pullus consisting of five smooth moderately convex whorls of slow increase.

Body-whorl obtusely angled at the periphery, regularly tapering to about three-fourths of its height where it is slightly constricted; ornamented with sigmoid striæ of growth, and in the anterior-fourth by wrinkled threads, narrower than the interspaces. Some young shells have punctated impressed lines on the body-whorl.

Dimensions.—Total length, 58; greatest diameter, 30; length of aperture, 56; length and breadth of pullus, 2.

Localities.—Rather common in the lower beds at Muddy Creek, and in the blue clays at Schnapper Point. Calciferous sandstones of the River Murray Cliffs near Morgan.

2. Conus ptychodermis, *spec. nov.*

Shell narrow, conoidal, a little more than twice as long as wide; spire very low, ending in a small obtuse pullus of two smooth whorls.

Spire consisting of four and a-half narrow flat whorls separated by a narrow channelled suture; ornamented spirally by a medial, more or less prominent, thread, with or without a few threadlets, crossed by arched prominent growth-ridges and by coincident striæ.

Body-whorl obtusely angled at the periphery, regularly tapering to the front; ornamented by inconspicuous spiral threads, which are wrinkled by the intercrossing of growth-folds, between which the surface is slightly contused.

Dimensions.—Length, 30; greatest width, 13; height of aperture, 28.

Locality.—Eocene beds at Muddy Creek.

3. Conus complicatus, *spec. nov.*

Shell varying from broadish- to narrow-conical, about twice as long as wide, spire very short, ending in a small obtuse pullus of two smooth whorls, the tip centrally immersed.

Spire-whorls four, narrow, the periphery slightly exsert, behind which they are slightly concave; ornamented by three or four broad depressed liræ, tessellated by regular, deeply arched, growth-ridges.

Body-whorl sharply angled and slightly elevated at the periphery, regularly tapering to the front; sculptured by somewhat regularly-disposed linear sulci; separated by broad depressed ridges of which the first and fourth are usually broader, more elevated, and covered with flat granulations which range more or less in lines coincident with the striæ of growth.

Growth-lines prominent, moderately ecurved, which produce slight crenatures in the spiral furrows. Outer lip slightly ecurved medially, deeply arcuately notched behind the peripheral angulation.

Dimensions.—Length, 18·5; greatest width, 10; length of aperture, 16·5; of another specimen, they are respectively 21, 10, 18.

Localities.—Eocene beds at Muddy Creek and Schnapper Point.

4. Conus pullulescens, *T. Woods.*

Reference.—Proc. Linnean Soc., New South Wales, vol. IV., p. 3, pl. i., fig. 4 (non. 3), 1880.

The author of the species-name included two different species under it, but both examples represent very young, almost unrecognisable, shells; however in respect of one (fig. 4), I have been able to trace it up to a shell of moderate size (herewith figured), to which the specific designation is very applicable.

The species is conspicuous by its large turbinated pullus of three smooth tumid whorls.

The spire is either flat or very shortly elevated, its whorls narrow, separated by a linear suture; ornamented with four or five spiral threads and rather slender, close, arched growth-lines.

The body-whorl is sharply angled, and is ornamented with flat spiral threads, becoming more or less obsolete with age (except at the front).

Dimensions.—Length, 32; greatest width, 15; length of aperture, 27; diameter of pullus, 3·5.

Localities.—Eocene beds at Muddy Creek, Schnapper Point, and River Murray Cliffs.

5. Conus ligatus, *spec. nov.*

Shell biconic; spire of variable height, but usually moderately low, consisting of about seven gradated whorls, ending in a small naticiform pullus of one and a-half smooth whorls; body-whorl more or less subpyriform.

Spire-whorls with an obtuse thick shoulder, the two slopes inclined approximately at a right angle and of about equal width; the posterior area is usually flat or slightly concave, rarely with a slight upward inclination; it is ornamented with four or five spiral threads, separated by narrower furrows, and rather close-set striæ of growth, conformable with the anal insinuation of the outer lip; the anterior area is provided with one or two threadlets margining the rib-like keel.

Body-whorl varying from pyriform to elongate-ovate, the peripheral keel defined anteriorly by a linear constriction, posterior to which there are one or two threads on the peripheral band. The surface is sculptured at the posterior part with incised linear lines, which towards the front become wider, and are finally replaced by ribs narrower than the shallow interspaces; the whole is crossed by growth-lines, which produce punctations in the linear sulci, and a fenestrated ornament anteriorly. The strength of the encircling lines is variable, and may be obsolete in the posterior half of the body-whorl.

The aperture is narrow, with a short anal sinus corresponding

with the posterior slope of the whorl; the outer lip is conspicuously ecurved medially.

Dimensions.—Of a large typical example. Length, 41; greatest width, 22; length of aperture, 34; length of last whorl, 35. Of a pyriform variety, the corresponding measures are—32, 20, 27·5, 28·5.

Localities.—Eocene beds at Muddy Creek and Schnapper Point.

Affinity.—This species exhibits much individual variation in shape of body-whorl and length of spire, but presents in the cord-like appearance of its peripheral keel a character which readily distinguishes it from other Australian species.

A figured variety so closely resembles *C. deperditus* of the Hampshire and Paris basins, that it is only by comparison of actual specimens possible to separate them. Though in this individual the gradation of the spire and the peripheral rib have lost much of their prominence, yet the defining threads on the keel are present—a character absent in *C. deperditus;* moreover, the latter is further distinguished by having two spiral and distant threads on the posterior area of the whorls. At the same time, the Australian similitude is no more than an extreme variation from a type which is obviously distinct from *C. deperditus.* However, it may be well to note that our Australian Cones are very difficult of specific definition, so much so that it is possible to bring all the species into very close relationship, through extreme individual variability.

6. Conus heterospira, *spec. nov.*

Shell acutely oval, biconic, with the anterior whorls of the spire gradated, the posterior ones more or less flatly depressed, rarely with a regular gradated spire throughout. The pullus arises abruptly from the spire as a small, smooth, shining papilla of one and a-half naticiform whorls.

Spire-whorls five; the penultimate one medially angulated, its anterior slope perpendicular, the posterior slope slightly inclined, but with a faint medial depression; on the ante-penultimate, the keel is close to the anterior suture, thence to the pullus the whorls are flat with a slight backward inclination whilst the keel appears as a slight rim.

The body-whorl is elongated and tapers to the front; the peripheral keel is sharp; the posterior slope, as also that of the spire whorls, is ornamented with prominent, much-arched, growth-lines, crossed by a few, usually obscure, spiral threads; the rest of the body-whorl is ornamented with close-set, equidistant, incised lines, punctatedly impressed by the faint growth-lines.

Aperture narrow; outer lip ecurved medially and somewhat deeply arcuately sinuated at the posterior angle.

Dimensions.—Length, 34; greatest width, 16; length of aperture, 28; of body-whorl, 30.

Localities.—Blue clays at Schnapper Point, not uncommon; calciferous sandstones, Bird Rock Bluff, near Spring Creek.

Affinities.—This species has much resemblance to *C. ligatus*, but it is more elongate and has not the rim-like keel of that species. A characteristic feature is the abrupt gradation of the anterior whorls in the adult; in adolescent specimens the regular sloping low spire make it difficult at first sight to attach them to the adult; at this stage it resembles *C. complicatus*, but differs by its ornamentation, and the young of *C. cuspidatus*, from which it differs by its obtuse pullus and by the strongly arched growth-lines on the slightly concave spire-whorls.

The elate variety closely resembles *C. Huttoni*, mihi (*C. Traillii*, Hutton, *non* Adams), of the Pareora formation, New Zealand, which has a much narrower outline, more elongated spire, and a more inclined posterior slope of the whorls.

7. Conus Ralphii, *Tenison-Woods.*

Reference.—Proc. Lin. Soc., N.S.W., vol. III., p. 228, t. 20, fig. 4 (1878).

Shell pyriformly oval, with a moderately elevated broadly conical spire, ending in a small naticiform pullus of one and a-half smooth whorls.

Spire-whorls seven, plane or flatly convex, separated by a slightly channelled suture, which is crenulated, or even nodulated, at the posterior margin of the earlier whorls; ornamented on the posterior-half of each whorl with usually three conspicuous equidistant incised spiral lines.

Body-whorl bluntly rounded, rarely subangulated, at the periphery; ornamented on the posterior slope with a few incised lines, the rest of the surface varying from smooth to faint spirally-linear-grooved, punctatedly impressed; the base is usually spirally wrinkled, but sometimes inconspicuously so.

Aperture narrow, obliquely incurved at the posterior angle; outer lip slightly ecurved medially.

Dimensions.—Length 40; greatest width, 21; length of aperture, 34; height of body-whorl, 35.

Localities.—Very common at Muddy Creek; rare in the calciferous sandstones of the River Murray Cliffs, near Morgan.

The species varies slightly in the height of the spire and in the proportion of the width to the length, also the spire-whorls may show a slight convexity and even a perceptible angulation at the posterior margin of the suture; rarely does the nodose crenulation

continue beyond the fourth whorl. *C. Ralphii* was founded on a very young individual, 10 mm. in length, at which stage of growth there are only four spire-whorls, but from an authentic specimen of that size I have traced it, through many intermediate stages, to the adult example which is here figured. The comparisons made by the original describer with certain species of the Viennese Miocene and with *C. Carmeli* of Australian waters are now no longer applicable, as the coronation of the whorls of our fossil is a character restricted to juvenile examples.

8. Conus acrotholoides, *spec. nov.*

Shell pyriformly oval, with a low, broadly conical, almost hemispheric spire, ending in a small, obtuse, apiculate pullus of two smooth whorls, the first of which is vertical and its tip immersed.

Spire-whorls four, suture more or less concealed by the overlapping of the posterior edge of the whorls; ornamented by four rounded threads, about as wide as the intervening furrows, and by fine curvilinear transverse striæ, the posterior suture is margined by a broader flat band.

Body-whorl bluntly rounded at the periphery, on which are three spiral threads; anterior to the periphery there are about 14 flat granulose threads, defined by linear lines, the flat interspaces are more or less spirally striated; the granulose liræ become crowded towards the front; the whole surface is marked with fine close-set striæ of growth.

The outer lip is post-medially ecurved, and obliquely and shortly notched at the posterior angle.

Dimensions.—Length, 14; greatest width, 7; length of aperture, 11·5.

Locality.—Blue clays at Schnapper Point.

9. Conus extenuatus, *spec. nov.*

Shell narrowly biconical, two and a-half times as long as wide; the spire subscalar, gradually tapering to the small obtuse pullus of two whorls, the first of which is oblique, with its tip immersed.

Spire-whorls seven, with the periphery slightly exsert, behind which they are slightly concave, separated by a narrow well-defined suture. The earlier whorls are slightly nodulose or crenulate at the keel, but this ornament disappears with the revolution of the spire. The spiral ornamentation consists of three or four unequal flat threads, which is crossed by close-set arched striæ.

Body-whorl bluntly keeled at the periphery, concave behind, slightly contracted in the anterior-third, but otherwise much attenuated towards the front. The surface with distant, regular, punctated, spiral grooves, between which are wider flat ridges.

Outer lip moderately ecurved medially; the anal notch is broad and shallow.

Dimensions.—Length, 60; greatest width, 24; length of aperture, 50.

Localities.—Muddy Creek; River Murray Cliffs; Spring Creek, near Geelong; Cheltenham (doubtful identifications).

10. Conus Hamiltonensis, *spec. nov.*

Similar to *C. extenuatus*, and perhaps only a variety, though not yet connected by intermediate forms; it differs by being proportionately broader, by the absence of nodulations and a keel on the earlier whorls, and by the more numerous spiral threads (about eleven) upon the spire-whorls.

The penultimate and body-whorl are obtusely keeled and nodulate. The median area of the body-whorl is smooth or obsoletely spiral-lirate, not sulcate.

Dimensions.—Length, 32·5; greatest breadth, 14; length of aperture, 25.

Locality.—Lower beds at Muddy Creek.

11. Conus Murravianus, *spec. nov.*

Shell narrowly biconical, more than twice as long as wide; spire scalar, gradually tapering to the cylindroid pullus of three and a-half smooth convex whorls.

Spire-whorls six, suture concealed by reflection of their posterior margin, bluntly angled a little in front of the middle, the longer backward-sloping area slightly concave; ornamented with close-set sigmoid striæ and obsolete spiral threads. The posterior-half of the first whorl is slightly costated.

Body-whorl broadly lanceolate in outline and narrowly truncate at the front, roundly angular at the periphery with a concave shoulder, which is obsoletely lirate; whole surface marked with fine sigmoidal growth-lines, and at the front by encircling ridges.

Outer lip with a shallow, obliquely-cut, notch at the posterior angle, thence with a gentle outward curve to the middle, and more rapidly declining to the front.

Dimensions.—Length, 61; greatest width, 26; length of aperture, 46.

Locality.—Calciferous sandstones of the River Murray Cliffs near Morgan.

This species comes near to *C. gradatulus*, Sow., and differs so far as one can judge by the figure, by the ante-medial position of the blunter keel on the spire-whorls.

12. Conus (Conorbis) atractoides, *spec. nov.*

Shell ovately fusiform, biconic; test moderately thick; surface spirally furrowed, smooth and shining. Spire regularly conical,

about one-third the total length of the shell, consisting of five whorls, ending in a small, blunt, turbinate pullus of two and a-half smooth rounded whorls.

Spire-whorls slightly convex, separated by a well-defined linear suture; ornamented by six flat spiral ribs, the three posterior ones separated by flat shallow sulci of about equal width, the three anterior ones by linear grooves sometimes almost obsolete; the interstitial furrows are punctulatedly impressed.

Body-whorl obtusely angled at the periphery, regularly attenuated anteriorly; ornamented with flat spiral ribs (about 30), separated by narrow furrows, crossed by sigmoidal lines of growth which produce the appearance of punctations in the interstitial furrows.

Aperture narrow, broadly emarginate in front; outer lip thin and sharp on the edge, smooth within, much ecurved medially.

Dimensions.—Length, 16·5; greatest width, 6·5; length of aperture, 10.

Locality.—Clayey greensands, Adelaide-bore.

Compared with actual specimens of *C. dormitor*, from the Eocene of Hampshire, it has a narrower outline and a longer spire, but especially differs by the ornamentation which consists of engraved, punctated, spiral lines, and not of raised threads with elegantly tessellated interspaces.

By its sulcate sculpture and greatly arched outer lip it is more allied with *C. alatus*, F. Edwards, of the Hampshire basin; but it seems to differ by its blunt-pointed apex and rounded shoulder to the whorls, whilst the proportional measurements indicate a narrower shell with a shorter aperture.

FAMILY CYPRÆIDÆ.

Genus Cypræa.

I have not been successful in arranging the species in conformity with the sectional subdivision of the genus as employed by recent conchologists. Those sections are largely based on external shape, and as some of our fossil species show extensive-enough variability as to necessitate the inclusion of the same species in two sections, I have been induced to group them in respect to themselves. Some of them are wholly unprovided for in the scheme of recent species, such as *C. gastroplax* with its wing-like base; and the group typefied by *C. eximia*, which though having a near ally in *C. umbilicata* of the same geographic region, yet markedly differs by the dental-sulcations of, and widely extending upon, the inner lip, though in one individual-specimen, through extreme age, the normal dentition is acquired.

SYNOPSIS OF SPECIES.

I. Base rounded.

1. Aperture notched or extending into a short canal behind.
   - Shell cylindroid; teeth small, numerous. 1. *C. parallela.*
   - Shell oval-oblong; teeth large.
     - Back elevated; spire concealed. 2. *C. scalena.*
     - Back depressed; spire prominent. 3. *C. subsidua.*
   - Shell elongate-oval; surface contused. 4. *C. ampullacea.*
   - Shell oval-subpyriform.
     - Spire slightly exsert; tumid; posterior canal distinct. 5. *C. Archeri.*
     - Spire nearly concealed; less tumid; posterior canal very short. 6. *C. Jonesiana.*
   - Shell globose; spire exsert; surface contused. 7. *C. contusa.*
2. Aperture roundly produced behind on left side, not distinctly notched posteriorly.
   - Shell cylindroid, spire exsert. 8. *C. subpyrulata.*
   - Shell cylindroid-subpyriform; spire umbilicated. 9. *C. brachypyga.*
   - Shell oval-subpyriform.
     - Spire concealed, umbilicated; outer lip much arched behind. 10. *C. pyrulata.*
   - Shell pyriform.
     - Spire concealed, slightly impressed; shell under one inch long. 11. *C. Murraviana.*
     - Spire exposed, deeply umbilicated; shell two inches or so long. 12. *C. leptorhyncha.*
   - Shell globose; spire convex. 13. *C. ovulatella.*

II. Base flat, not winged.

1. Inner lip strongly dentate-sulcate.
   - Anterior canal much produced, attenuated.
     - Beak straight or nearly so.
       - Shell oval-pyriform; beak with two dorsal tubercles. 14. *C. eximia.*
       - Shell globose-pyriform; beak with or without basal tubercles. 15. *C. sphærodoma.*
     - Beak much upturned, without basal tubercles.
       - Shell oval-oblong, very gibbous. 16. *C. toxorhyncha.*
   - Anterior canal short, obtuse, without basal tubercles.
     - Shell oblong-subpyriform; posterior canal subtruncate with a very wide base. 17. *C. platypyga.*
     - Shell more oval; posterior canal narrow, short. 18. *C. consobrina.*

2. Inner lip tuberculate or tooth-ridged, not dentate-sulcate (also *C. sphærodoma*, pars), or edentulous.

Anterior canal much produced, depressed.

Shell pyriform ; aperture almost edentulous. 19. *C. platyrhyncha*

Anterior canal short.

Shell broadly oval, with a low convex back ; anterior canal straight ; both lips dentate throughout. 20. *C. amygdalina.*

Shell oval, very large, back very gibbous, anterior canal upturned ; aperture almost edentulous. 21. *C. gigas.*

Shell spheroidal, very large. 22. *C. dorsata.*

III. Base flat, dilated into a horizontal circular disk.

Shell oval, very gibbous. 23. *C. gastroplax-*

EXCLUDED SPECIES.

C. oviformis, Sow., is attributed to Tenison-Woods as author, nd to South Australia for habitat, by Johnston in Geol. Tas-nania, 1888; but Tenison-Woods refers (Geo. Obs. in S. Aust., . 83, 1862) to this species as a London Clay fossil, and not as ccurring in South Australia.

1. Cypræa parallela, *spec. nov.*

Shell cylindrical, twice as long as wide; the spire exsert, around hich the body-whorl is flatly rounded ; the longitudinal curva-ure of the back is interrupted at intervals, which gives rise to the ppearance of spiral threads, usually conspicuous towards the two nds, but is sometimes obsolete.

The aperture is shortly produced into a bluntly-pointed canal t the ends, narrowed at the front. The outer lip is margined at he two extremities, leaving a median unmargined portion of ariable length ; the teeth are small and numerous (about thirty). he inner lip is thickened, and slightly projecting posteriorly ; here are about twenty teeth in its whole length ; the columella rojects internally towards the front as a broad, concave, ridged late.

Dimensions.—Length, 18 ; width, 9 ; height, 8.

Locality.—Eocene; Muddy Creek.

This species resembles dwarfed examples of *C. Isabella*, Linn., f the Indo-Australian region, but has an exsert spire, and is lightly more narrowed at the front.

2. Cypræa scalena, *spec. nov.*

Shell oval-oblong, somewhat gibbous, highest near the middle, ith a steep slope anteriorly and rather abruptly narrowed at

the front, subtruncated at both ends; left side swollen; spire incompletely concealed, slightly exsert.

Aperture narrow, margined with elongate teeth; outer lip slightly margined at the two extremities, shortly projecting beyond the spire; inner lip thickened posteriorly and confluent with the outer lip, forming a very short canal; front part of columella much elevated internally, concave and ribbed.

Surface of the shell smooth or marked with faint distant spiral lines and obscure contusions.

Dimensions.—Length, 37; width, 24; height, 21.

Locality.—Eocene; Muddy Creek.

This fossil comes very near to *C. Reevei*, Gray, recent in S.W. Australia, but is proportionately higher and consequently the slopes from the highest point are more rapid, the front is more narrowed, whilst the swollen left-side gives it a distinctive lop-sided profile. The corresponding measures of *C. Reevei* are 37, 22, and 19.

3. Cypræa subsidua, *spec. nov.*

Shell oval- inclined to trapezoidal- oblong, depressedly convex, obtuse at both ends; the right side flatly rounded, the left more arched and rather abruptly contracted to the front; spire exsert.

Aperture narrow, base rather flat; outer lip not margined, broadly subplanulate medially, with about twenty-five stout rounded ridges. Inner lip developed behind into a prominent protuberance margining the short anal canal and posterior part of the aperture, with about twenty acute ridges; it is somewhat flattened towards the front, and runs out into a narrow triangular extension of the base, supporting the very short, truncate, anterior canal. The columella is much elevated internally and very concave.

The surface of the shell is smooth.

Dimensions of a large example.—Length, 26; width, 17·5; height, 14. Of a small example, 18, 11·5, and 9.

Locality.—Eocene; Muddy Creek.

The squat-form, flattish base and post-ventral protuberance distinguish this species from *C. scalena*, which from its undeveloped appearance might be regarded as an inmature state of that species. But the numerous examples under observation prove that the adolescent feature is proper to the adult as it is in the living *C. Reevei* and its fossil analogue *C. scalena*. Without comparison of actual specimens, I am not sure if this be distinct from *C. Bartonensis*, F. Edw., of the English Eocene, though the Australian shell appears different, by its large posterior boss and the less prominent spire.

4. Cypræa ampullacea, *spec. nov.*

Shell elliptic-oval, highest and widest a little behind the middle; obtusely rounded apically with a very narrow, flat, exposed spire; gradually narrowed to the front; surface transversely and spirally lineate, the small rectangular interspaces contusedly impressed.

Aperture moderately wide; slightly curved and obsoletely notched posteriorly; extended into a short straight beak, which is somewhat effusively expanded at the tip. Outer lip not margined, distantly toothed (about thirty), making a very acute angle at its junction with the inner lip. Inner lip with a short, slight ridge-like thickening at the posterior end, provided throughout with long tooth-ridges (about twenty-five).

Dimensions.—Length, 34; width, 19; height, 18.

Locality.—Eocene blue-clay at Schnapper Point; one example, apparently not quite mature, as the posterior canal and the lips are incompletely developed.

5. Cypræa Archeri, *Tenison-Woods.*

Reference.—Proc. Roy. Soc., Tasmania, tab. 1, figs., 9-9*a*, p. 22 (1876).

Shell oval-subpyriform, moderately inflated. Shortly narrowed and truncated at each end; spire exsert; surface smooth or spirally lineate.

Outer lip margined externally, thickly inflected, very slightly produced behind, with about 20 rounded dental ridges; inner lip having a short elevated callosity confluent with the outer lip intervening between which is a slight anal notch; the inner lip has about 15 subacute dental ridges.

Dimensions.—The species varies a little in shape, particularly as to the proportionate length. I give the measures of a short and long example. (1) Length, 20; width, 13; greatest height, 11, at 9 mm. from the posterior end. (2) Length, 27; width, 15·5; height, 14.

Locality.—Table Cape, Tasmania! *(R. M. Johnston).*

I cannot attach any of our Continental cowries to this species, though it has a distant resemblance to *C. pyrulata* and *C. Murraviana.* Its inclusion in the published lists of River Murray and Muddy Creek fossils is now withdrawn.

6. Cypræa Jonesiana, *spec. nov.*

This is comparable with *C. Archeri*; from the short variety of which it differs by being less tumid and proportionately narrower, from both varieties it differs by its gentle front slope similar to *C. pyrulata*, but it has not the produced posterior emargination of that species.

The spire is more or less concealed. The outer lip is broadly reflected, prominently margined, and is furnished with 20 prominent teeth; the inner lip has 18 narrow elongate teeth.

Dimensions.—Length, 17·5; width, 11; greatest height, 9, at 7 mm. from the posterior end.

Localities.—Miocene; Muddy Creek. Older Pliocene; Dry Creek-bore, near Adelaide.

The species-name is a public acknowledgment of the valuable aid rendered to geologic science in South Australia, more particularly in reference to Tertiary Geology, by Mr. W. J. Jones, Conservator for Water.

7. Cypræa contusa, *McCoy*.

Reference.—*C. (Luponia) contusa*, Pal. Vict., Decade V., tab. 49, figs. 3-3*c*, 4-4*a* (1877).

Shell globular; spire slightly projecting, consisting of three slightly convex whorls, the apex obtuse and prominent; anterior canal very short. Surface irregularly reticulated with small contusions or irregular polygonal bruise-like depressions.

Dimensions.—Length, 30; proportional width, $\frac{78}{100}$; height, $\frac{70}{100}$.

Localities.—Eocene. Muddy Creek!; Schnapper Point!; *(McCoy)*; River Murray Cliffs, rather common, but usually dwarfed!

8. Cypræa subpyrulata, *spec. nov.*

Shell cylindroid or narrowly oval-oblong; spire exposed, the rounded periphery of the penultimate whorl exsert and constricted above and below; the body-whorl arises abruptly from the suture with a well-rounded curve to the highest point of the low back, which is a little behind the middle; surface smooth.

Aperture rather wide, shortly loop-like behind, without a distinct posterior canal, anteriorly produced into a short straight beak with effuse lips. Outer lip margined, inconspicuously reflected, denticulated (about 25), slightly roundly-extending beyond the spire. Inner lip with a slight ridge-like thickening at the anal insinuation and confluent with outer lip, there are about 20 long narrow tooth-ridges.

Dimensions.—Length, 25·5; width, 13; height, 11.

Locality.—Eocene; Muddy Creek (common).

This species is somewhat intermediate in outline between *C. parallela* and *C. pyrulata*; from the former it differs by its outer lip more arched and projecting behind, by its less abrupt front-truncation, and its short anterior canal; from the latter by its cylindroid outline.

9. Cypræa brachypyga, *spec. nov.*

Allied to *C. subpyrulata*, but is much attenuated to the front

and always small; the spire is exserted. In shape it varies from ellipsoid-cylindrical to cylindroid-subpyriform. The outer lip is narrowly reflected, distinctly margined, emarginate but not canaliculate behind, and provided with about 20 transverse teeth; the inner lip has about 15 teeth.

Dimensions.—Length, 15·5; width, 8; height, 7 (at 5·5 mm. from the posterior end).

Localities.—Eocene; Muddy Creek and Schnapper Point.

10. Cypræa pyrulata, *spec. nov.*

Shell cylindroid-pyriform, inflated posteriorly and gradually tapering to the front; spire more or less concealed, narrowly but deeply umbilicated, from the edge of which the whorl arises abruptly with a well-rounded curve to the highest point of the back, which is at about two-fifths the total length from the posterior end. Surface smooth or spirally lineate.

Aperture rather wide, emarginate but not canaliculate behind, extending at the front into a short straight truncated beak. Outer lip narrowly inflected, not distinctly margined, transversely ridged (about 25), much-curved behind and projecting beyond the spire. Inner lip hardly thickened and not at all produced posteriorly, with about 20 dentate ridges.

Dimensions of two examples.—Length, 27 and 24; width, 16 and 13·5; height, 13·5 and 11·5.

Locality.—Eocene; Muddy Creek (very common).

11. Cypræa Murraviana. *spec. nov.*

Shell pyriform, back ventricose, abruptly rounded to the concealed faintly-depressed spire, tapering rapidly but not so abruptly to a straight, broadish, very short, truncated beak, which is rounded on the margins.

Aperture narrow, gently curved posteriorly, the outer lip projecting backwards into a short lobe with a thickened quadrate margin; there is no anal canal. Outer lip broadly inflected, externally margined, with about 20 narrow tooth-ridges; inner lip convexly rounded, with from 12 to 15 long slender ridges; columella-plate narrow, ridged, anteriorly running out in an oblique tooth-like ridge to the extremity of the beak.

Dimensions.—Length, 20; width, 14; height, 11·5 (at 8·75mm. from the posterior end).

Localities. — Eocene. River Murray Cliffs!; near Mount Arapiles, Victoria *(J. Dennant).*

This fossil cowry resembles *C. pyrulata* by its protuberant arched outer lip and the absence of a posterior canal, but differs by being more ventricose in the dorsal profile, more abruptly narrowed at front and by the much incrassated outer lip. From

C. Archeri it differs in its globosely pyriform shape and the greater posterior curvature of the aperture. Among extra-limital species it makes a near approach, judging by illustrations, to *C. inflata*, Lamarck, of the English and Parisian Eocene, but is more abruptly attenuate to the front, and the aperture not so gradually arched behind.

12. Cypræa leptorhyncha, *McCoy*.

Reference.—*C. (Luponia) leptorhyncha*, Pal. Vict., Decade V., tab. 49, fig. 1—1c. (1877).

Pyriform, ventricose; spire exposed, deeply depressed; outer lip much arched and protuberant posteriorly, no distinct anal canal; anterior canal straight, short, narrowed and subtruncate at the front.

Dimensions.—Length, 58; width, 36; height, 31.

Localities.—Eocene. Muddy Creek!; River Murray Cliffs!; Schnapper Point! (*McCoy*); Cheltenham!

The author of the species compares it with *C. inflata* and *C. globularis*, of the European Eocene, and with *C. Haveri* and *C. Genei*, Michelotti, of the Italian Miocene; but distinguishes it by the greatly inarched posterior end of the outer lip as well as the different form of the anterior beak.

13. Cypræa ovulatella, *spec. nov.*

Shell globose, abruptly descending to the broad flatly-convex spire, less abruptly descending to the short truncate anterior canal, which is bevelled on the inner margin and somewhat effusively reflected.

Aperture roundly-narrowed posteriorly, thence widening to the base of the anterior canal, which is almost closed by the approximation of the large basal plications of each lip.

Outer lip narrowly-reflected, flat, but with a sharply rounded exterior margin, furnished on the inner edge with from eight to ten strong tooth-ridges, the anterior one of which is oblique, and margins the left side of the canal. Inner lip with ten to eleven small transverse ridges; the columella-plate is high, abruptly ascending from the inner lip, bluntly crenate on the edge; columella with a strong fold, which runs out to the front of the anterior canal.

Dimensions.—Length, 11; width, 8·5; height, 7 (at 4·5 mm. from the posterior end).

Localities.—Eocene; Aldinga Cliffs and Adelaide-bore.

This species has a general resemblance to the recent *Trivia ovulata*, Lamarck, but the produced anterior canal separates it generically.

14. Cypræa eximia, *G. B. Sowerby.*

References.—Sow. in Strzelecki's "New South Wales," p. 296, tab. 19, figs 1—3 (1845). *C. (Aricia) eximia* (Sow.), McCoy, Pal. Vict., Dec. III., tabs. 28, 29, figs. 2—2b (1876).

Pyriform, ventricose posteriorly, beaked at both ends, abruptly and obtusely subtruncate over the flat almost-concealed spire, tapering gradually into a long convex straight beak, which is supported on each side by a narrow triangular, straight and sharp-edged, plate-like extension of the base. At the base of the beak on each side of its upper aspect is an oblong rounded tubercle. The posterior canal is shorter than the anterior one, supported by a flange-like extension of the base, slightly upturned and bent to the left; its right side is broader, and carries an oblong tubercle. Outer lip inflected, strongly toothed on the inner margin; inner lip with narrow deep sulci, with broad intervening flat ridges. Columella without an internal plate-like extension.

Dimensions.—Length varying from about 100 to 65 mm.; the proportional width, $\frac{80}{100}$; height, $\frac{80}{100}$; length of snout, $\frac{22}{100}$; of anal canal, $\frac{80}{100}$, but variable.

Localities.—Eocene. Muddy Creek!; Schnapper Point!; Fyansford, and three miles west of Gellibrand River (*McCoy*). Well-sinking at Franklin, near Launceston (*Strzelecki*), at a depth of 140 feet; Table Cape (*Hobart Mus.*).

This species is the type of a section not represented in living creation, though having a general resemblance to *C. umbilicata*, Sow., constituting Josseaume's Section *Umbilia*, which may be characterised by the dentate-sulcated inner lip, not denticulate-ridged, as pointed out by G. B. Sowerby in his description of it. Sowerby's comparison was with *C. Scottii*, *C. umbilicata* being at that time yet unknown.

Both Sowerby's and McCoy's figures show the anal canal bent to the right, whereas all of several specimens which I have had under examination have it twisted in the opposite direction.

15. Cypræa sphærodoma, *spec. nov.*

A near alliance of *C. eximia*, but differs by its globose body-whorl, also by the abrupt sinistral curvature of the posterior-third of the aperture and the strong torsion of the posterior canal In other particulars there is a close agreement.

Dimensions.—Total length, 84; length, excluding canals, 46; width, 48; height, 40.

The proportional measures of these two closely-related species are—

	Length (excl. canals).	Width.	Height.
C. eximia ...	100	82	70
C. sphærodoma ...	100	104	87

Localities.—Eocene. River Murray Cliffs, near Morgan! ; Muddy Creek! (*J. Dennant*).

VAR.? The example from Muddy Creek is of the length of about five and a-quarter inches and has the inflated back of the type, but otherwise it presents differential characters, which might from an extreme point of view be regarded as of sectional value, though I am inclined to consider them as the result of individual variation of an extreme senile growth.

The anterior canal is longer and slightly curved upwards, but the basal flanges are broad and acutely rounded on the edge ; there are no basal tubercles. The posterior canal is the same, except that the basal flanges are flatly, broadly, and thinly expanded. But the chief differences belong to the aperture ; on the columella-side the base is broad and flatly-rounded to the inner margin, which carries about thirty short, convex, dental ridges, about equal in width to the interspaces ; the outer lip, instead of being convexedly inflected, is flat or slightly concavedly-declinous from the exterior to the inner margin, on the latter of which there are about thirty sharply-rounded narrow dental ridges becoming effaced at from one-half to one-third the width from the inner margin. Thus the chief exceptional characters are the short teeth and flat inner lip, replacing the dental-sulcations on a steeply-inclined area, in which regard this variety makes a connecting link between *C. eximia* and *C. umbilicata*.

Dimensions.—Length, 135 ; width, 75 ; height, 55 ; length of anterior canal, 35 ; of posterior canal, 25.

16. Cypræa toxorhyncha, *spec. nov.*

Resembles *C. eximia*, but differs by its high steep-sided back and bent canals.

The back is very ventricose, abruptly rounded to the flat almost-concealed spire, abruptly tapering to the anterior canal ; the left side is very steep, but the right is less abrupt. The posterior canal, viewed from above, is very broad at the base, with thick rounded margins, the beaked-portion is broadly convex, not upturned though slightly bent ; its margins are much thickened, the inner side extends beyond the other ; there is no basal tubercle. The anterior canal is supported by a thick round-edged extension of the base, and has no basal tubercles ; the canal is cylindroid, almost closed, much upturned and slightly bent to the left.

Dimensions.—Total length, 94 ; length from spire to base of anterior canal, 55 ; width, 47 ; height, 43. The relative proportions to the length of the shell, exclusive of the canals, of the two species are as follows :—

C. eximia—Length, 100 ; width, 82 ; height, 70.

C. toxorhyncha—Length, 100 ; width, 85 ; height, 78.

Though these proportionals indicate a wider and higher shell for *C. toxorhyncha*, yet they fail to express the striking differences in the profiles of the two species.

Locality.—Eocene; Muddy Creek *(J. Dennant)*.

17. Cypræa platypyga, *McCoy.*

Reference.—*C. (Aricia) platypyga*, Pal. Vict., Decade III., tab. 30, figs. 1—1*c* (1876).

This somewhat oblong-pyriform shell is remarkable for its short, extremely wide, subtruncate, posterior beak; the right side of which is much wider than the more-pointed left side.

Dimensions.—Length, 75; width, 45; height, 39.

Localities.—Eocene. Schnapper Point! *(McCoy)*; Muddy Creek!; Table Cape *(R. M. Johnston)*.

18. Cypræa consobrina, *McCoy.*

Reference.—*C. (Aricia) consobrina*, Pal. Vict., Dec. V., tab. 49, figs. 2—2*c* (1877).

"Related to *C. platypyga*, but is more oval, much shorter canals and concealed spire. Length, 2 inches 8 lines; width, $\frac{65}{100}$; height, $\frac{55}{100}$. Very rare at the Moorabool River."—*McCoy.*

Erroneously quoted as occurring in the River Murray Cliffs.

19. Cypræa platyrhyncha, *McCoy.*

Reference.—*C. (Aricia) platyrhyncha*, Pal. Vict., Dec. III., tab. 30, figs. 2—20 (1876).

Pyriform, gradually tapering to a broad, flat, elongate truncated beak; posterior canal short and abruptly reflexed; spire concealed; anterior part of aperture with a few small obtuse teeth, the rest edentulous.

Dimensions.—Length, 100; width, 47; height, 43; length of anterior canal, 25.

Localities.—Eocene. Bird-Rock Bluff, Spring Creek (*McCoy*); Table Cape (*R. M. Johnston*).

20. Cypræa amygdalina, *spec. nov.*

Shell broadly oval, with a moderately low convex back, highest at about three-sevenths from the posterior end, thence flatly convex to the abrupt margin of the slightly-sunken concealed spire; the anterior portion tapers gradually to the short, straight, broad, subtruncated canal. The posterior canal is short, though prominent, obtuse, slightly upturned, and bent to the left.

Aperture rather wide, the hinder part gently arched to the left. Outer lip flatly rounded, broadly inflected, with about twenty short rounded teeth on the inner margin, which are somewhat evanescent posteriorly. The base on the right side is very broad in the middle, concavely sloping at the aperture, which is fur-

nished in the anterior-half with about eight obtuse tubercles, sometimes shortly prolonged on to the base, and towards the posterior end with four or five elongated teeth, the rest of the inner lip obsoletely denticulate. The columella is rounded, not internally extending in the form of an erect plate.

Dimensions.—Length, 57; width, 36; height, 28.

Locality.—Well-sinking in the Murray Desert.

This species is not much unlike *C. Mappa*, but it has a different dorsal and transverse outline.

21. Cypræa gigas, *McCoy.*

References.—Ann. Mag. Nat. Hist., p. 438 (1867); *C. (Aricia) gigas*, Pal. Vict., Decade II., tab. 15, tab. 16, fig. 2, tabs. 17 and 18, fig. 1 (1875); Dec. III., tabs. 28 and 29, fig. 1 (1876).

Shell very large, oval, back very gibbous, roundly sloping at both ends; anterior canal deep, narrow, elongate, projecting upwards; posterior canal obliquely truncate, reflexed upwards, and adherent to the spire. Base flattened, oval, much thickened; inner lip rounded, smooth within, flattened near the anterior canal; outer lip inflected, tumid, broad, with nine or ten obsolete obtuse teeth near the anterior end and a few near the posterior end.

Dimensions.—Length, 8 inches; proportional width, $\frac{67}{100}$; height, $\frac{55}{100}$.

Localities.—Muddy Creek, Schnapper Point, and near the mouth of the Gelibrand River *(McCoy)*. Casts probably of this species, River Murray Cliffs.

This is the largest known Cowry, living or fossil.

22. Cypræa dorsata, *spec. nov.*

Shell very large, sphæroidal; abruptly rounded at both ends, inflatedly rounded at the sides; spire concealed. Anterior canal deep, narrow, short, upturned, obliquely truncate; posterior canal rather broad, deep, short, confluent with the spire. Base as in *C. gigas*.

Dimensions.—Length, 95; width, 75; height, 65.

Localities.—Eocene. Muddy Creek *(J. Dennant)*; Schnapper Point *(R. T.)*.

This rival, in point of size, to *C. gigas* (as it attains to considerably larger dimensions than those of the type-specimen) is separable from it by its sphæroidal form and very short anterior canal; it stands to that species in much the same way that *C. decipiens* does to *C. Thersites*.

23. Cypræa gastroplax, *McCoy.*

Reference.—*C. (Aricia) gastroplax*, Pal. Vict., Decade II., tab. 16, fig. 1; tabs. 17 and 18, fig. 2; 1875.

"The enormously extended circular thin flange into which the base is extended renders this cowry totally unlike any previously known living or fossil species. Length and width of body-whorl 2½ and 2 inches; with disc length and width 4¼ inches. Spire small, blunt, of two volutions. Rather rare at Mornington, Hobson's Bay."—*McCoy*.

Genus Trivia.

synopsis of species.

Shell cross-ribbed.
  Shell globose, with linear dorsal furrow.
    1. *T. avellanoides*.
  Shell oblong, with large dorsal smooth area.
    2. *T. erugata*.
Shell smooth, without cross-ribs, globose. 3. *T. pompholugota*.

1. Trivia avellanoides, *McCoy*.

1876. Cypræa (Trivia) avellanoides, *McCoy*, Pal. Vict., Decade III., tabs. 28, 29, figs. 3—3*c*.
1877. Trivia Europæa *(Montfort)*, *Tenison-Woods*, Proc. Roy. Soc., Tasmania, p. 91.
1879. Trivia minima, *Tenison-Woods*, Proc. Lin. Soc., N.S. Wales, vol. IV., p. 4, tab. 1, fig. 8.
1884. Trivia avellanoides *(McCoy)*, *Tate*, Proc. Roy. Soc., Tasm., p. 209; id., *Johnston*, p. 222.

Shell thin, oval-globose; surface ornamented with very narrow, sharply defined, thread-like ridges, which are usually interrupted by a narrow smooth space along the middle line of the back.

As pointed out by McCoy, it is much more globose and has much fewer and more distant cross-ribs than *T. australis*; but it is the counterpart of *T. avellana*, Sow., of the English Crags (hence its specific name), distinguishable especially by its uniformly shorter and more spheroidal form.

Tenison-Woods referred dwarfed examples of this species to *T. Europæa*, from which it is separable by much the same characters as it is from *T. australis*.

Tenison-Woods figures and describes an early stage of growth of this species as *T. minima*, relying for a differential character on the absence of a dorsal division between the ridges; he judged, moreover, the shell to be an adult because of the thickened lips, overlooking the fact that *Trivia*, unlike *Cypræa*, exhibits no shell-metamorphosis. An examination of many small examples of *T. avellanoides* permits me to state that the smooth dorsal area does not begin to develop until the shell has reached a length of about eight millimetres.

Dimensions.—Length of a large specimen, 31; the average

proportional width is $\frac{78}{100}$, height, $\frac{70}{100}$; but dwarfed examples of from 10 to 15 mm. are more common.

Localities.—This is one of the commonest and most widely diffused species of the Australian Eocene-beds. South Australia.—River Murray Cliffs; Turritella-clays, Aldinga-cliffs; bore at Adelaide. Victoria.—Schnapper Point !, Muddy Creek ! and Corio Bay ! *(McCoy)*; Spring Creek ! Tasmania.—Table Cape !; and Turritella-limestones, Flinders' Island *(Johnston)*.

2. Trivia erugata, *spec. nov.*

Shell thin, narrowly oblong, spire concealed. The back is broadest and highest near the posterior end, is depressedly convex in a longitudinal direction, abruptly sloping to the posterior end, but more gently to the front; the right side is rather steep, medially slightly depressed, the left side is more convex. In young shells the median constriction is very pronounced, and the spire is prominently exsert.

The aperture is narrow; the outer lip narrowly thickened and indistinctly margined, it is slightly incurved medially, rounded at the extremities, and ornamented with about 25 teeth.

The cross-ribs are evanescent at about half the length of the sides, being thus interrupted by a large oval smooth dorsal area.

Dimensions.—Length, 5·5; greatest width, 3; and height, 2·5.

Locality.—Lowermost horizon of the Muddy Creek-section.

T. erugata differs from known, recent and fossil, species by the combination of an oblong shape with a large smooth dorsal area.

3. Trivia pompholugota, *spec. nov.*

Shell globose, smooth and shining, abruptly descending to the excessively short anterior canal and to the slightly-projecting spire.

Aperture moderately wide, rounded behind. Outer lip slightly projecting behind, narrowly thickened and inflected, minutely wavy-wrinkled, margined externally, provided with sixteen stout elevated ridges; inner lip with a keel-like margin, which is tuberculate-dentate (eight tubercles in the anterior-half and sixteen in two rows in the posterior-half); the columella-plate is high, flatly-concave, smooth, and reaches to the front.

Dimensions.—Length, 7·5; width, 5·5; height, 5.

Locality.—Adelaide-bore.

The apertural characters, which, however, indicate a somewhat adolescent shell, are those rather of *Trivia* than *Cypræa*.

Genus Erato.

The affinities of this genus are considered by some conchologists to be with *Marginella*, but I revert to its location in the Family Cypræidæ.

SYNOPSIS OF SPECIES.

Back without a longitudinal furrow [ERATO, *sensu stricto*].
Columella spirally ridged at the front; aperture narrow.
Pyriform-oval; spire very short. 1. *E. minor.*
Fusiform-oval; spire elevated. 2. *E australis.*
Columella ending in a strong spiral plait; aperture moderately wide.
Pyriform-oval.
Outer lip squarely shouldered behind.
3. *E. pyrulata.*
Outer lip roundly sloping behind, more attenuated to the front. 4. *E. Morningtonensis.*
Cylindric-oblong. 5. *E. duplicata*
Back with a longitudinal sulcus [ERATOPSIS].
Columella tooth-ridged at the front; shell pyriform-oval.
6. *E. illota.*

SPECIES EXCLUDED.

E.? octoplicata (*Woods*), *Tate*, is a true *Marginella* as originally placed.

1. Erato minor, *Tate.*

Reference.—Trans. Roy. Soc. S, Aust., vol. I., p. 96, 1878.

Shell minute, shining, triangularly pear-shaped, rather tumid, abruptly narrowed in front; spire short, obtusely pointed, the terminal whorls narrow and flat. Aperture narrow, straight, emarginate behind. Outer lip roundly inflected with about fifteen denticles, broadly and varicosely reflected on the body-whorl, callously spreading behind on the penultimate whorl; the varicose reflection is minutely granulate or pustulate. The outer lip is squarely curved behind, and ascends to about the middle of the penultimate whorl.

The columella has five crowded, slender, oblique ridges at the front, which are succeeded by denticles for the greater part of the rest of the lip.

Dimensions.—Length, 4; width, 2·5; height, 2·25 (at 1·25 from the posterior end).

Localities.—Eocene. Muddy Creek; River Murray Cliffs, near Morgan; probably Table Cape and Schnapper Point (the single specimen from each locality not satisfactorily determined).

Worn specimens are similar to *E. Sandwicensis*, Pease, but are broader, and more inflated posteriorly with a shorter and more abrupt spire; the resemblance to *E. nana* is greater, but the broader squared-shoulder distinguishes the fossil. Unworn examples are like to a dwarfed *E. lachyrma*, except for the conspicuous posterior angulation of the outer lip.

Marginella micula, mihi, a cohabitant species, very closely simulates this *Erato*.

2. Erato australis, *Tate.*

Reference.—Op. cit., p. 96, 1878.

Shell elongate-oval, fusiform, acute at both ends; spire acutely conical, rather elevated.

Whorls five, body-whorl rotundately angled in front of the suture and constrictedly attenuated at the front. Spire-whorls slightly convex, ending abruptly in a small flattened pullus of one and a-half exceedingly narrow whorls.

Aperture rather narrow, slightly insinuated behind, narrowed at the front. Outer lip moderately thickened and inflected, ascending to the middle of the penultimate whorl, with about 20 tooth-ridges. Columella with four (usually), slender, oblique rounded thread-like ridges succeeded behind by a few denticles (not always developed).

Dimensions.—Length, 8; width, 4·25; height, 4 (at 4 mm. from the posterior end).

Localities.—Eocene. Aldinga Cliffs and Adelaide-bore (very common); rare at Spring Creek!

3. Erato pyrulata, *spec. nov.*

Shell pyriformly ovate, tumid, the right side steeply sloping, the left somewhat inflated; highest near the posterior end, steeply rounded to the very short spire of three depressed whorls (in senile examples, callously covered), rapidly attenuated to the front.

Aperture moderately wide, nearly straight, but widest and emarginate behind, narrowed to the short anterior canal. Outer lip thickened and reflected, its inner margin with from 14 to 16 short prominent tooth-ridges; bent at right angles to meet the spire on which it extends or projects beyond it, thence it is straight to the front.

Inner lip angulated, with small denticles on the keel behind the twisted columella-plait which runs out on the short beak as an elevated margin.

Dimensions.—Length, 7·5; width, 5; height, 4 (at 2·5 mm. from posterior end).

Localities.—Aldinga Cliffs and Adelaide-bore.

E. pyrulata is not well placed generically, its terminal spiral plait on the columella, running out to form the left margin of a slightly effuse canal, recalls *Marginella* and *Cyprœa*, and to some extent *Ovulum*; but as it presents, in the adult, the characteristic angulated and denticulated inner lip of *Erato*, I am unwilling to establish a new genus for it and the two following species

possibly on a more extended knowledge of the recent and fossil species of *Erato*, this may prove a desirable course.

The denticles on the two lips appear when the adult stage is reached, but the columella-plait belongs to all ages. In its adolescent stage this species resembles *Marginella edentula*, mihi, a more inflated shell with a convex pillar. The present species differs in shape, being broader and more truncated behind, from all living forms.

4. Erato Morningtonensis, *spec. nov.*

Similar to *E. pyrulata*, but is not so tumid, has a longer and more gradually attenuated body-whorl, is more pointed behind, the outer lip with a broadly-rounded shoulder and slightly incurved towards the front.

The columella has only two or three denticles behind the terminal plait.

Dimensions.—Length, 6; width, 3·5; height, 3 (at 2·5 mm. from the posterior end).

The proportional measures of the two species are :—

E. Morningtonensis—Length, 100; width, 58·3; height 50.

E. pyrulata—Length, 100; width, 71·4; height, 57·1.

Locality.—Eocene clays; Schnapper Point, near Mornington.

5. Erato duplicata, *Johnston.*

Reference.—Geol. Tasmania, tab. 31, fig. 14; no description (1888).

Shell minute, cylindric-oblong, bluntly pointed at both ends; dorsal profile, flatly convex on the right, rounded and narrower on the left; spire very short and blunt.

Aperture moderately wide, nearly straight. Outer lip narrowly inflected, somewhat abruptly arched behind, spreading callously on the spire; denticulate ridges narrow, about 14. Inner lip slightly angled, with a row of small denticles on the keel, exterior to which are a few scattered denticles and ridges forming an irregular outer row. Columella extending internally as a high, slightly concave, smooth plate, the anterior edge of which runs out into an oblique plait, sulcate at the tip, margining the anterior canal.

The high columella-plate with its anterior plait-like margin recalls *Cypræa;* but as the unique example seems somewhat immature it may be unsafe to speculate on its probable generic position, and so I leave it as originally placed.

Dimensions.—Length, 5·5; width, 3·5; height, 3.

Locality.—Eocene; Table Cape *(R. M. Johnston!).*

6. Erato (Eratopsis) illota, *spec. nov.*

Shell minute, pyriform-ovate; spire short, obtusely pointed;

whole shell, except a broad dorsal sulcus, covered with a smooth enamel. Outer lip broadly inflected, not margined, smooth, with eighteen to twenty narrow tooth-ridges; inner lip with three stout oblique ridges at the front, which are succeeded by denticles.

Dimensions.—Length, 4; width, 3; height, 2·5.

Locality.—Miocene; Muddy Creek.

The few specimens under observation are slightly worn, and may be mistaken for rolled examples of *E. minor*. In *Eratopsis* it comes nearest in shape to *E. nana*, but it is broader, shorter, and not granulated.

FAMILY OVULIDÆ.

Genus Simnia, *Rissoa* (1826).

Simnia (Neosimnia) exigua, *spec. nov.*

Shell narrow-elongate, a little more than four times at long as wide, shortly rostrate, and straight at both ends; tapering regularly towards the bluntly-rounded posterior end from a point between a third and a fourth of the whole length from the front; obliquely subtruncated anteriorly. Viewed from above, the left profile is slightly arched, being almost straight; on the right it is nearly straight in the medial-third, thence gently curving to the extremities, but more rapidly behind than to the front. The surface is smooth, and beautifully spirally wavy-striate.

The aperture is very narrow behind, gradually widening from about the middle to near the front, where it again narrows, though somewhat dilated.

Columella distinct, sharply truncate in front, with a wide canal; posteriorly with a strong oblique callous fold.

Outer lip thickened, margined externally, edentulous, medially straightish, gently curved to the very short effusively dilated posterior canal, abruptly curved to the short anterior canal.

Dimensions.—Total length, 11·5; greatest width, 2·75; height, 2.

Locality.—Eocene; Muddy Creek.

By its narrow outline and short rostral prolongations the present species comes nearest to *S. acicularis*, Lamarck, of the West Indies, but apart from the posterior fold it appears to be a narrower shell; *S. lanceolata*, Sow., is narrower, but the extremities are longer in proportion to the enrolled portion of the shell, and it lacks the posterior fold. Not one of the recent species included in the Section Neosimnia has the narrow profile of this fossil-species; Dall* remarks of *Neosimnia* that "it is a convenient section of *Simnia*, but the distinction between the two is very

* Blake-Mollusca, vol. II., p. 234.

slight in some species, and it sometimes happens that one might easily assign the same species to one or the other, according to the stage of growth which it has attained." Having regard to the opinion of this distinguished conchologist, I have made my comparisons among species of the genus in its widest acceptation.

FAMILY SCALARIIDÆ.

The Australian Tertiary species of this family belong to two well-defined genera, *Crossea* and *Scalaria*.

Crossea contains the turbinate species with an entire peristome, the columella slightly produced and infolded to form a short canal, the umbilicus more or less concealed or margined by a funicular rib; the genus has certain affinities conchologically with *Ethalia*, and some species of *Rissoina* and *Lacuna* simulate it in their apertural characters.

Scalaria, used in its widest sense, contains the more or less pyramidal species, without the canaliculate aperture; it numbers about 400 species, recent and fossil, and there is great need for the dismemberment of the genus to facilitate specific reference. The Eocene-species of France have been arranged by MM. De Boury and Cossmann into several genera and numerous subgenera; and though the subdivision is perhaps rather strained, yet I have largely availed myself of their classification in the elaboration of our Tertiary species. I do not altogether appreciate the relative values of their genera and subgenera; and find it convenient to admit only *Scalaria* as of generic value, though its species seem to fall naturally into two chief groups—*Scalaria* (sensu stricto) with an entire aperture and *Acirsa* with its incomplete peristome.

Genus Crossea *A. Adams* (1865).

SYNOPSIS OF SPECIES.

Outer lip plain; shell depressed turbinate; spire-whorls punctate. 1. *C. princeps.*

Outer lip varied.

Conic-turbinate, lirate. 2. *C. sublabiata.*

Globose-turbinate, smooth or obsoletely linear-sulcate at the base. 3. *C. lauta.*

EXCLUDED SPECIES.

Crossea parvula, *Tenison-Woods*, is transferred to *Collonia*.

The genus has hitherto been unknown in a fossil state, being represented by six species, two inhabiting Japanese and four the Australian seas. These species fall into three sections, to two of which the fossil-species belong; all are briefly indicated in the following synopsis:—

I. Shell with several varices.

C. miranda, A. Adams. Recent; Japan.

II. Shell with a variced lip.

C. labiata, Tenison-Woods. Recent; Tasmania, S. Australia.
C. sublabiata, Tate. Eocene; Australia.
C. lauta, Tate. Miocene; Australia.

III. Shell with a simple lip.

1. Whorls punctate (at the least the posterior ones).
   C. concinna, Angas. Recent; N.S. Wales.
   C. princeps, Tate. Eocene; Australia.
2. Whorls cancellate.
   C. bellula, A. Adams. Recent; Japan.
   C. cancellata, Tenison-Woods. Recent; Tasmania.
   C. striata, Watson. Recent; N.E. Australia.

1. Crossea princeps, *spec. nov.*

Shell depressedly conoidal, rather solid, polished, of five rounded whorls.

Apex of one and a half smooth narrow depressed concave whorls; the next whorl is flattened in the posterior-half and ornamented with a few spiral rows of large punctations. With the revolution of the spire the rapidly increasing whorls become convex, the lines of punctations increase, and the punctures become smaller and numerous; finally at about the half-turn of the penultimate whorl the punctated ornament disappears.

The last whorl is smooth, convex, finely transversely striated, and faintly spirally lined; whilst the anterior suture is bordered by a narrow, somewhat ascending ligatural band, which continues on to the penultimate for about a half-turn; a few spiral punctate striæ appear on the base.

Aperture circular, outer lip simple, inner lip double. Columella with a narrow triangular excavation on its inner face, extending from about the middle position to the front, where it is interrupted by an oblique tooth-like plait, which defines the outer margin of a very short canal, supported by the basal funicular rib.

The narrow umbilical chink is bordered by a rounded stout, elevated funicular rib, which ends at the inner basal angle of the aperture, and on which the apertural canaliculation is formed.

Dimensions.—Length, 4.25; width, 4·25; height of aperture, 2·5; width of aperture, 2·25.

Localities.—Eocene. Adelaide-bore!; River Murray Cliffs near Morgan!; Muddy Creek!

This neat species is the fossil analogue of *C. concinna*, Angas, but in that species the posterior whorls are strongly lirate and

cancellate, whilst the ordinary spire-whorls are conspicuously and broadly flattened behind, but are without an infra-sutural ligature.

2. Crossea sublabiata, *spec. nov.*

Synonym.—*Crossea labiata*, Tenison-Woods, Proc. Roy. Soc., Tasmania, for 1876 (name only); *id.*, Johnston, P. R. S., Tasm., for 1884, p. 221.

Shell conoidal-turbinate, somewhat solid; spire elevated; whorls five, rounded, and distantly, irregularly and coarsely spirally-lirate; suture distinct.

Body-whorl relatively very large; aperture oval, posteriorly angulate, obtusely angled and obsoletely channelled at the columella-margin; outer lip varicosely dilated. Umbilical chink narrow and deep, bordered by a rounded not very prominent funicular rib.

Dimensions.—Length, 4; width, 2·5; height of aperture, 2·5; width of aperture, 1·5; unusually large specimens have a length of 5 mm.

Localities.—Eocene. Muddy Creek!; Table Cape *(Hobart Mus.)*.

The Table Cape-specimens of this fossil species were originally referred by Tenison-Woods to his *C. labiata;* and were subsequently carefully compared by Mr. Johnston with an extensive collection of the living forms, who remarks, "That although the fossil representatives are decidedly larger than the living ones, there are no characteristic differences between them so far as the tests are concerned, if we except the fact that in the living form the varix is generally sharper and more decidedly reflexed. In the fossil representatives the striæ upon the varix are almost obsolete and consequently the latter has not that appearance which Mr. Woods describes as 'fringe-like.' So far as the trifling differences go, I must admit that they are sufficiently constant to enable a careful classifier to recognise the living from among the fossil representatives with a considerable degree of confidence."

After a minute comparison of an extensive suite of specimens of *C. labiata*, including authentic examples from Tasmania, with many examples from Muddy Creek; I can confidently endorse the opinions of Mr. Johnston, touching the differential characters of the two, though at the same time I fail to recognise the "fringe-like" varix described by Mr. Woods, probably his type is only an extreme individual development. In addition to the angular outer margin of the broader varix of the living species, I have recognised that the lirate ornament is very fine and close, whilst it is coarse and distant in the fossil. With these two characters one cannot fail to separate the living from its fossil representative—characters which I regard as of specific value.

I have not seen examples from Table Cape, but there cannot be any doubt that they are conspecific with the Muddy Creek types of *C. sublabiata*.

3. Crossea lauta, *spec. nov.*

Shell globosely turbinated, with a large tumid body-whorl and very low broad conical spire.

Whorls four, convex, smooth and shining. Body-whorl with a narrow infrasutural band and a few obsolete linear-sulcations at the base. Aperture broadly oval; outer lip stoutly variceally thickened, sharply margined behind; columella much arched; umbilical chink wide and deep, bordered by a stout, rather sharply elevated, furnicular rib.

Dimensions.—Length, 3; width, 3; height of aperture, 2; width of aperture, 1·5.

Locality.—Miocene. Muddy Creek!

C. lauta somewhat resembles in shape *C. princeps*, but has a varied outer lip; in which latter character it agrees with *C. labiata* and *C. sublabiata*, but is readily distinguished from them by its globose profile.

Genus Scalaria.

SYNOPSIS OF SPECIES.

I. *Peristome entire; no basal rib.*

1. Shell costated, with or without varices; aperture circular [Clathrus].
   No varices; costæ lamellar; spirally lineate, 1. *S. interstriata.*
2. Shell varied; *spirally linear-punctate-grooved;* peristome thick [Nodiscala].
   Whorls subangular; costæ thick, evanescent behind. 2. *S. basinodosa.*
   Whorls rounded.
   Suture crenate-dentate; coarsely punctured. 3. *S. prionota.*
   Suture plain; finely punctated. 4. *S. Hamiltonensis.*
3. Shell lamellate-costated; with or without varices; umbilical chink margined by a *funicular rib adherent to the pillar* [Crisposcala].
   Lamellæ distant, pointed behind; spirally lirate and striate. 5. *S. echinophora.*

II. *Peristome entire; base with a concentric rib.*

4. Shell lamellate-costated, with or without varices; impunctate; basal keel ending at inner angle of aperture adjacent to the funicular rib [Circuloscala].

Costæ lamellose, near together. 6. *S. foliosa.*
Costæ filiform, varices prominent; fenestrated; whorls almost disjointed. 7. *S. orycta.*

5. Shell costated and variced, *punctate;* basal keel ending at inner angle or middle position of aperture [PUNCTISCALA].
Whorls medially angulated; shell turrited; spirally finely-lirate. 8. *S. loxopleura.*
Whorls not angulated.
Shell elongate-turrited.
Whorls convex, spirally lirate.
9. *S. bulbulifera.*
Whorls flattish, spirally linear-sulcate.
10. *S. eritima.*
Shell pyrimidal; whorls slightly convex, spirally wavy-striated, costæ dentate at posterior suture.
11. *S. microrhysa.*

6. Shell costated and variced, impunctate; basal keel ending at outer angle of aperture [CIRSOTREMA].
Costæ filiform; coarsely lirate, subgranose at intersections.
12. *S. transenna.*
Costæ lamellose; spirally lirate and striated.
Lamellæ lamellose, straight-edged.
13. *S. Mariae.*
Lamellæ crowded, frilled. 14. *S. pleiophylla.*

III. *Peristome incomplete.*

7. Periphery angulated, aperture subquadrate, columella flattened and angulated in front, base lirate; shell thick, tessellated, without varices [EGLISIA].
15. *S. triplicata.*

8. Periphery angulated, aperture oval; shell thin, cancellated, with or without varices [ACRILLA].
Base disk-like.
Shell smooth, minutely umbilicated.
16. *S. inornata.*
Shell costated, imperfectly variced.
17. *S. pachypleura.*
Base subangulated and lirate.
Costæ filiform and distant.
Whorls convex.
Tessellated by equal liræ and costæ.
18. *S. escharioides.*
Costæ stout, liræ slender; apical whorls angulated. 19. *S. glyphospira.*
Costæ thick; spirally linear-sulcate; apical whorls bulbiform. 20. *S. mutica.*

Costæ stout, liræ feeble; pullus pyramidal, whorls convex. 21. *S. cylindracea.*

Whorls shouldered, trilirate in front, smooth behind; pullus subcylindrical. 22. *S. gonioides.*

Costæ lamelliform and crowded. 23. *S. crebrelamellata.*

9. Periphery rounded; aperture oval; shell stout, costated, lirate and variced [HEMIACIRSA].

Costæ and liræ few and stout. 24. *S. lampra.*

Costæ and liræ more numerous, slender. 25. *S. polynema.*

1. Scalaria (Clathrus) interstriata, *sp. nov.*

Shell turrited, small, slender, acute, thin, translucent, imperforate; ordinary whorls eight, convex, separated by a deep suture; nuclear whorls three, smooth, gradually attenuate to the tip.

The transverse ornament consists of thin, moderately elevated, oblique lamellæ which are continuous from whorl to whorl; there are 17 to each of the anterior whorls. Varices absent. The spiral sculpture consists of intercostal incised lines.

Aperture circular; peristome entire; outer lip thin, reflected, formed by the last costal-lamella. Base convex, traversed by the costæ, without a basal keel or funicular rib.

Dimensions.—Length, 11; width, 3; diameter of aperture, 2.

Locality.—Eocene; Muddy Creek (*J. Dennant;* very rare).

This is the oldest-known species of the subgenus, which according to M. de Boury did not appear till the Miocene; from the Italian Miocene and Pliocene species, it is distinguished by its more numerous and thin costæ. If we admit the subgenus *Hyaloscala*, De Boury (1890), which includes the thin and transparent species of *Clathrus*, then our fossil has few alliances, it most resembles the elate variety of *S. Jukesiana*, which has, however, no intercostal spiral striations.

2. Scalaria (Nodiscala) basinodosa, *spec. nov.*

Shell very small, slender, acute, solid, imperforate, with six ordinary whorls and two and a half smooth shining rounded nuclear whorls.

Spire-whorls slightly convex, with an angulated profile by reason of the medial enlargement of the costæ. The spiral ornament consists of crowded punctated engraved lines, and a narrow band, crenated on the margin, at the anterior edge of the suture to which it is closely appressed. The transverse ornament consists of slightly angular and medially thickened ribs (12 on the penultimate whorl), which do not reach the posterior suture; on

the anterior-half of the body-whorl, the ribs are reduced to stout nodosities. There are three stout varices on the spire.

Aperture nearly circular; peristome complete with a groove around its inner margin, the exterior of the outer lip formed by the very thick varix; base rounded.

Dimensions.—Length, 4·5; width, 1; height of aperture, 1.

Locality.—Eocene; Muddy Creek *(one ex.)*.

This species is separable from *S. Hamiltonensis*, by its smaller size, slenderness, and discontinuity of the costæ, &c.

This and the next two species I have referred to De Boury's genus *Nodiscala*, despite the absence of a basal disk, though some of De Boury's species which have the disk feebly developed may be regarded as connecting these extreme forms with the typical species.

3. Scalaria (Nodiscala) prionota, *spec. nov.*

Shell turrited, slender, acute, stout, imperforate; ordinary whorls eight, slightly convex, costated and sparsely variced; nuclear whorls unknown.

The transverse ornament consists of stout rounded nearly straight costæ, which are a little produced upon and adpressed to the preceding whorl, so that the sutural line is conspicuously sinuate-dentate; on the body-whorl they extend on to the base, are a little angulated and nodosely enlarged at the periphery. There is only one varix on the spire. The spiral ornament consists of very narrow flat threads, with linear punctated interspaces (about 20 on penultimate whorl), which are continuous across the costæ.

Aperture obliquely oval; peristome entire, grooved around; the exterior lip formed by the very thick varix. Base rounded, without carina or special sculpture.

Dimensions.—Length, 8; width, 2·5; length of aperture, 2.

Locality.—Eocene. Muddy Creek *(one ex.)*.

S. prionota differs from *S. Hamiltonensis* in being less slender, coarsely punctated, and by its crenate-dentate suture.

4. Scalaria (Nodiscala) Hamiltonensis, *spec. nov.*

Shell elongate-turrited, acute, stout, imperforate; ordinary whorls seven; flatly convex, costated and sparsely variced, suture linear; nuclear whorls two, smooth, rounded. The transverse ornament consists of thick, filiform, nearly straight costæ, slightly attenuated at the posterior suture, but continuous from whorl to whorl; on the anterior-half of the body-whorl, they are slightly nodosely elevated in the middle, but are evanescent at the base; there are about 10 on the body-whorl, but about 12 on the penultimate-whorl. Varices very irregularly disposed rarely more than two or three on the spire.

The spiral ornament consists of crowded regular linear punctated grooves.

Aperture oval, oblique, almost lunate; peristome entire, with a groove around its inner margin, outside of which is the punctated face of the very thick varix. Base convex or slightly depressed, without a distinct basal keel.

Dimensions.—Length, 8; width, 2·25; length of aperture, 2.

Locality.—Eocene. Muddy Creek (not rare).

6. Scalaria (Crisposcala) echinophora, *spec. nov.*

Shell broadly turrited, thin, acute, imperforate, with eleven normal whorls and three smooth shining tumid nuclear whorls.

Spire-whorls very convex, but by reason of the posterior truncation of the costæ the profile is gradated.

The transverse ornament consists of numerous (about 20 on the anterior whorls) oblique, elevated, frilled, lamelliform costæ, usually composed of two or three connate lamellæ; the costæ are roundly shouldered at the posterior two-thirds, and are extended there into an erect short-lanceolate plate; there are no proper varices.

The spiral ornament consists of broad, subacute, prominent liræ; the angular and narrow interstitial furrows are sculptured by a few distant linear spiral grooves.

Aperture circular; peristome complete; columella margined externally by a narrow funicular rib which runs-out to the tip of the slightly flattened and expanded columella; the base is rounded.

Dimensions.—Length, 20 (estimated); width, including costæ, 6; width of aperture, 3.

Localities.—Eocene. River Murray Cliffs!; Corio Bay, near Geelong!

S. echinophora has some analogy with *Crisposcala junctilamella* of the Paris-basin, but it is more elongated, and is further distinguished by its frilled lamellæ and spiral liræ. It might be mistaken for *S. foliosa*, *S. Mariæ*, or *S. pleiophylla*; but the absence of a basal keel at once separates it.

6. Scalaria (Circuloscala) foliosa, *spec. nov.*

Shell rather large, somewhat thin, imperforate. Similar to *S. echinophora*, but the lamellæ are more numerous (25 and two thick varices on the body-whorl), less apiculate at the rounder shoulder.

Aperture nearly circular, a little higher than wide; peristome complete; outer lip broadly and varicosely expanded, crenated on the sharp margin. Columella margined by a funicular rib, in close contiguity to which is a revolving rib which terminates at the inner angle of the aperture.

This species is intermediate between *Criposcala* and *Circuloscala*, the basal rib which is in an alignment with the posterior angle of the aperture terminates a little in front of the umbilical funiculus, and not at the outer angle of the aperture, as in *Circuloscala*. It has very distinctive characters, though simulating *Crisposcala echinophora* and *Cirsotrema pleiophylla*.

Dimensions.—Length, unknown; height of body-whorl, 8; width of body-whorl, 6; of aperture, 2·25.

Locality.—Blue clays at Schnapper Point!

7. Scalaria (Circuloscala) oryeta, *spec. nov.*

Shell rather thin, elongate, imperforate; whorls very convex, almost disunited, variced, tessellated by thick spiral liræ and filiform costæ.

The spiral ornament consists of broad flat equidistant liræ alternating with smooth and somewhat-wider interspaces; on the penultimate whorl, there are five medial threads, succeeded anteriorly by four narrower ones, and on the posterior area there are about eight threads.

The transverse ornament consists of slightly-arched filiform costæ which by intersection with the liræ produce rectangular interspaces on the medial and anterior areas; there are two thick filiform varices to each whorl.

Aperture circular; peristome entire; base rounded, interrupted by a raised convex anti-peripheral rib, dentate-serrated by the costæ passing across it; columella margined by an adherent funicular rib.

The species has very distinctive characteristics.

Dimensions.—Length, unknown; width of body-whorl, 3·5; height of body-whorl, 5·5; of aperture, 2·5.

Locality.—Eocene; Muddy Creek!

8. Scalaria (Punctiscala) loxopleura, *spec. nov.*

Shell stout, rather slender, imperforate; ordinary whorls six, medially subangulated, separated by a well-defined linear suture; apical whorls unknown.

The spiral ornament consists of numerous (about 20 on the penultimate whorl) crowded undulose threadlets, separated by slightly-narrower punctated linear grooves.

The transverse ornament consists of stout-filiform, oblique and slightly-bent costæ (about 20 on the penultimate whorl), which are crenulated by the spiral liræ; there are about three very prominent oblique varices on the spire.

Base angulated by a broadish depressed keel which is nodosely-crenulated by the costæ; the area in front of the basal keel is slightly concave and concentrically lirate. Aperture circular;

peristome entire, the outer margin of which is bordered by the punctate-lirate face of an elevated varix.

Dimensions.—Length, 5; width, 1·5.

Locality.—Eocene; Adelaide-bore (4 exs.).

9. Scalaria (Punctiscala) bulbulifera, *spec. nov.*

Shell small, slender, acute, solid, imperforate; ordinary whorls seven and a-half, moderately convex; nuclear whorls two, smooth, very tumid, disproportionately large, the last one and a-half forming an obtuse bulbiform apex to the spire.

The spiral sculpture consists of linear sulcations or flattened crowded threads (about 15 on the penultimate whorl); the extremely narrow interspaces are punctate, at least those on the last and penultimate whorls.

The transverse ornament consists of rather stout, subacute medially thickened, slightly oblique costæ, about 10 on each of the anterior whorls; and of elevated, narrow rounded varices, two on each whorl. The spiral threads pass across the costæ but are interrupted by the varices.

Aperture circular, with a groove around its inner margin, outside of which is the punctate-striated anterior face of the elevated varix. Base slightly concave, defined by a strong keel, concentrically finely striated.

Dimensions.—Length, 6; breadth, 2; aperture, 1.

Locality.—Eocene; not rare at Muddy Creek; worn and probably derived in Miocene-beds at the same place.

10. Scalaria (Punctiscala) eritima, *spec. nov.*

Shell stout, elongate, acute, imperforate; ordinary whorls 11, flatly convex, suture partially concealed by the crenatedly-extended margin of the preceding whorl; apical whorls three, very convex, of gradual increase.

The spiral ornament consists of punctated linear sulcations (about 20 on the penultimate whorl), rather crowded in front of the suture, but about twice the width of the linear furrows on the rest of the whorl.

The transverse ornament consists of nearly straight, rather thick and elevated, convex costæ, slightly denticulatedly-produced at the posterior suture, but are in an alignment from whorl to whorl; there are about 12 costæ to a whorl, and five or six prominent varices on the spire; both costæ and varices are crossed by the spiral grooves.

Base angulated by a prominent keel, widely crenulated by the costæ; the anti-peripheral area is narrow and abruptly concave, somewhat undulose transversely, concentrically punctatedly-grooved.

Aperture circular; peristome entire, with a groove around its

inner margin, outside of which is the punctated-sulcated and transversely striated anterior face of the elevated varix.

Dimensions.—Length, 13; width, 3; diameter of aperture, 1.

Locality.—Eocene; Muddy Creek!

11. Scalaria (Punctiscala) microrhysa, *spec. nov.*

Shell stout, pyramidal, obtuse, imperforate; ordinary whorls five and a-half, flatly convex; suture deep, partially concealed by the protuberant costæ of the preceding whorl; apical whorls two and a-half, the median portion of the pullus very tumid and excentric, the tip is relatively very small and immersed.

The spiral ornament consists of very slender, crowded, undulose threadlets; the slightly-wider linear interspaces punctatedly-impressed.

The transverse ornament consists of slightly-oblique, broad, convex costæ, extending beyond the posterior suture of the anterior whorls in the form of blunt denticulations; there are about 14 costæ on the penultimate whorl. The concave intercostal spaces, which are a little wider than the costæ, and the costæ are transversely microscopically striated. There are no varices on the spire.

Base angulated by a broad convex keel; the anti-peripheral area flat or very slightly concave, concentrically striate, and faintly radially-ribbed. Aperture oval; peristome completed by a callous growth, but not double; outer lip formed by a costa.

Dimensions.—Length, 9·5; width, 3·25.

Locality.—Eocene. Bird-rock Bluff, Spring Creek, near Geelong (*J. Dennant*, very rare).

The subgeneric position assigned to this species is not satisfactory, though the incompleteness of the aperture may merely indicate an adolescent stage of growth.

12. Scalaria (Cirsotrema) transenna, *spec. nov.*

Shell large, elongate, stout, acute, imperforate, with 11 ordinary moderately convex whorls; the nuclear whorls not known.

The spiral ornament consists of four or five stout filiform liræ, one median and one on each side of it are about equidistant, the fourth is close to the third, whilst the exsert basal keel forms a fifth, margining the anterior suture, there are a few smaller threads on the posterior area; the interliral spaces have three or four linear sulcations separated by broad flat threads.

The transverse ornament consists of filiform costæ, not so stout as the stronger liræ, which produce slight nodulations at the intersections with the liræ; there are 25 costæ on the penultimate whorl, they are slightly oblique, equal, and equidistant. The posterior slope is transversely striated. There are two stout

filiform varices on the spire, they are longitudinally striated and crossed by the liræ.

The base is defined by a rounded peripheral keel; ornamented by irregular-disposed, flat, concentric threads, which are more or less wrinkled, and radially striated and obsoletely costated.

Aperture roundly oblong; peristome complete; columella slightly reflected and projecting, margined externally by a funicular rib; outer lip margined by a very stout varix, lirate and longitudinally striated.

Dimensions.—Length, 21; width, 6; height of aperture, 4; width of aperture, 3.

Locality.—Blue clays at Schnapper Point.

Scalaria (Cirostrema) Mariæ, *Tate.*

References.—*Caloscala Mariæ*, Tate, Southern Science Record, January, 1885, p. 3; *Cirsotrema Mariæ*, De Boury, Etude sur les Sous Genres de Scalidæ, p. 40, 1887.

Shell turrited, about three times as long as wide, imperforate; whorls numerous, convex, suture deep; transversely laminate-costated, variced, and spirally lirate. Costæ lamellar, thin, equidistant, increasing from about 12 to 20 in a whorl with the revolution of the spire.

Varices conspicuous, more elevated than the costæ, subacute on the edge, about one in a whorl, usually two, sometimes three on the body-whorl. Liræ subacute, prominent, equidistant, about 10; the flattish interstitial furrows (a little wider than the liræ) and the liræ are sculptured with a few distant linear spiral grooves alternating with wider depressed threads.

Body-whorl regularly convex to the peripheral rib; base concave, traversed by the costæ and spirally striated.

Aperture circular; peristome entire, varicosely thickened and reflected, with a groove around its inner margin; columella flatly expanded and slightly projecting at the front, where it is supported by an umbilical funiculus which is limited behind by the penultimate varix.

The posterior whorls are occasionally slightly angular, and their ribs and varices are usually subspinosely produced behind near the suture.

Dimensions.—Length, about 35; breadth, 10·5; height of last whorl, 15; diameter of peristome 8, of aperture 5.

Locality.—Eocene; glauconitic limestones of Aldinga Bay.

This species is the type of my subgenus *Caloscala*, which through inadequate appreciation of the characters of *Cirsotrema* I had thought to be different from it; M. de Boury says it is incontestably a *Cirsotrema*, and that it has much affinity with *Scalaria acuta*, Sowerby, of the Hampshire and Parisian Eocene. *S. acuta*

has the whorls flatter behind and is (usually ?) without varices; but *S. Mariæ* has nearer allies in *S. Zelebori*, Frauenfeld, and *S. lyrata*, Zittel. From the former it is easily separable by its fewer costæ, distinct varices and more elevated and thinner liræ; from the latter by its more numerous and lamellated costæ.

14. Scalaria (Cirsotrema) pleiophylla, *spec. nov.*

Shell like *Circuloscala foliosa*, but with a distinct basal keel. Its numerous frilled lamellæ separate it from *Cirsotrema Mariæ*.

There are two rounded apical whorls, the first of which is somewhat depressed, and about ten ordinary whorls; there are 20 to 25 costæ to a whorl.

Dimensions.—Length, 20; width, 5·5.

Localities.—Eocene. Adelaide-bore; Corio Bay and Spring Creek, near Geelong.

15. Scalaria (Eglisia) triplicata, *spec. nov.*

Shell moderately stout, turrited, about four times as long as wide, imperforate; whorls about 15, of which the two nuclear ones are roundly angled and obscurely lirate, apex acute; the earlier spire-whorls medially angulate, the convexity becoming more and more tricarinate with the slow revolution of the spire, more contracted in front than behind. Suture distinct.

The spiral ornament consists of three prominent elevated rounded liræ, which are equidistant and approximate, the middle one is the stouter and is slightly in front of the middle line of the whorl; a small thread is interposed between the posterior carination and the suture.

The transverse or axial ornament consists of thin slightly elevated lamelliform costæ, equal and equidistant, about 25 to a whorl, are continuous from whorl to whorl and become wider apart with the revolution of the spire; the lamellæ are oblique, but curved forward at and decurrent with the posterior suture. There are no varices.

Body-whorl with four strong liræ, the anterior one in an alignment with the suture (though there concealed) forms a basal keel; base flatly convex, with about 10 concentric threads, crossed by radiating threads continuous with the lamelliform costæ.

Aperture squarely rounded, peristome incomplete; outer lip thin; columella reflected and slightly effusedly dilated at the front.

Dimensions.—Length, 28; width, 7; height and width of aperture, 5.

Localities.—Not uncommon in the Miocene-strata at Muddy Creek; and at Red Bluff, Gippsland Lakes. Also Older Pliocene; Croydon-bore, near Adelaide.

I have attached this species to *Eglisia*, because of the close

resemblance, judging by figures, it bears to the recent *E. tricarinata*, and in a less degree to the extinct *S. (Eglisia) impar*, Deshayes; from the first it is distinguished by the absence of a slight shoulder to the whorls and by its conspicuous tessellated ornament, whilst the latter species is quadrilirate and very small.

Our Australian fossil presents many points of resemblance to *Acrilla*, but is devoid of the disk-like base; and as a whole the characters are rather those of *Scalaria* than of *Turritella*.

16. Scalaria (Acrilla) inornata, *spec. nov.*

Shell minute, thin, very slender; with eleven, smooth, rather tumid, slowly-increasing whorls.

Base disk-like, spirally lineate, margined exteriorly by a thread-like rib; slightly perforated. Aperture quadrately rounded.

Dimensions.—Length, 3·75; width, 0·75.

Locality.—Eocene; Table Cape, Tasmania (2 exs.).

17. Scalaria (Acrilla) pachypleura, *spec. nov.*

Shell thin, elongate-turriculate, imperforate; ordinary whorls eight, convex, separated by a moderately deep suture; pullus of two smooth rounded whorls, the first slightly angulated and depressed.

The ornament consists of flat spiral threads crossed by slightly more-distant, thicker, and rounder costæ; the rectangular interliral spaces, which are a little longer in a spiral direction than wide, have a double row of three to four punctures; there are about 30 costæ and 15 liræ on the penultimate whorl, and five or six varices on the spire.

Base flattened, smooth, margined externally by an acute thread. Aperture roundly oblong, peristome incomplete, outer lip thin.

Dimensions.—Length, 11·5; width, 3; height of aperture, 2·25.

Locality.—Eocene at Muddy Creek.

This species has a close resemblance to *Scalaria reticulata*, Solander (*S. decussata*, Lamk.); but on a comparison of actual specimens, our fossil differs from the Hampshire and Parisian one by its thicker costæ, finer and more numerous spiral threads, by its varices and more slender form, and particularly by the punctures.

18. Scalaria (Acrilla) escharoides, *spec. nov.*

Shell thin, slender, imperforate; ordinary whorls seven, rather flat, tessellated; pullus rather large, consisting of two smooth rounded corrugated whorls.

The spiral ornament consists of stout flat threads, increasing from six in the posterior whorls to ten in the penultimate whorl; the spirals are crossed by slightly-oblique costal threads, usually not so stout as the liræ, somewhat granosely thickened at the intersections; there are about 25 costæ on the penultimate whorl.

Body-whorl convex, with a flattish base defined by the anterior spiral; anterior to the peripheral angulation, there are three or four encircling threadlets. Aperture oval, outer lip thin.

Dimensions.—Length, 7; width, 1·75; height of aperture, 1·5; an incomplete example has a greatest width of 2·5.

Locality.—Eocene; Muddy Creek!

19. Scalaria (Acrilla) glyphospira, *spec. nov.*

Shell minute, thin, slender, imperforate; ordinary whorls five, moderately convex, strongly costate and slenderly lirate; the apex is obtuse, and consists of two and a-half smooth large angulated turns.

The costæ are filiform, prominent, and slightly arched, equal and equidistant, about 12 on the body-whorl. The spiral ornament consists of narrow subacute threads, separated by wider intervals, about 9 on the penultimate whorl; the liræ do not cross the costæ.

Body-whorl convex with a flattish spirally-lineate base, which is margined by the anterior spiral-thread. Aperture oval, outer lip thin.

Dimensions.—Length, 4; width, 1.

Locality.—Eocene; Muddy Creek.

20. Scalaria (Acrilla) mutica, *spec. nov.*

Shell small, elongate-turriculate, imperforate; ordinary whorls six, moderately convex, costated and spirally lineate-sulcate; apex obtuse, consisting of two smooth convex whorls.

The costæ are moderately stout, distant, ten on the body-whorl; the intercostal spaces with about four to six engraved spiral lines. Base of body-whorl flatly-rounded, obscurely lirate, and subangulated on the periphery; aperture oval.

Dimensions.—Length, 5; width, 1·25.

Locality.—Eocene; Muddy Creek! (not uncommon).

21. Scalaria (Acrilla) cylindracea, *spec. nov.*

Shell small, rather stout, turriculate, imperforate; ordinary whorls eight, almost flat, costated, and obscurely lirate; nuclear whorls four, gradually tapering to an acute apex.

The costæ are stout, nearly straight, about ten to a whorl; the intercostal spaces with about five slender spiral threadlets. Base subangulated, obsoletely spirally-lirate; aperture oval.

Dimensions.—Length, 5 5; width, 1·75.

Locality.—Eocene; Muddy Creek.

22. Scalaria (Acrilla) gonioides, *spec. nov.*

Shell minute, thin, elongate-turriculate, imperforate; ordinary whorls angulated post-medially, costated, and lirate; nuclear whorls two, smooth, shining, somewhat-tumid.

The costæ are subacute, moderately elevated, slightly angulated post-medially. The median area of each whorl with three flattish equidistant liræ; there is a slender threadlet at the anterior suture, but the posterior slope is smooth. There are four stout liræ on the median portion of the body-whorl, the anterior one of which forms a basal keel; the base is ornamented with three distant, encircling, filiform liræ. Aperture quadrately oval, outer lip thin.

Dimensions.—Length, 4; width, 1,

Locality.—Eocene; Muddy Creek! (very rare).

23. Scalaria (Acrilla) crebrelamellata, *spec. nov.*

Shell rather thin, very slender, imperforate; ordinary whorls nine, flat, with a slightly channelled suture; nuclear whorls two and a-half, the anterior one much contracted and ornamented with crowded oblique threadlets, the next is inflated and smooth ending in a bulbiform tip.

The transverse ornament of oblique, crowded, short, erect lamellæ, which are usually so dense as to conceal the suture and the spiral ornament; the latter consists of five, equi-distant, equal, narrow, elevated, flat-edged liræ.

Body whorl with six spiral liræ, the anterior one interrupting the convexity of the base; base with a strong spiral thread and radially striate.

Dimensions.—Length, 9; width, 2.

Locality.—Eocene; Muddy Creek (very rare).

24. Scalaria (Hemiacirsa) lampra, *spec. nov.*

Shell *Turbonilla*-like, subulate-turrited, stout, smooth and shining; ordinary whorls about 10, nearly flat, costated, varieed and spirally linear-grooved; apex pointed of about two small convex whorls.

The costæ are straight, slightly oblique, subacute and moderately raised, separated by much wider concave interspaces; from about 12 to 15 in each whorl. The varices are broad and rather depressed.

The spiral ornament consists of flat grooves, with wider flat interspaces, somewhat irregularly disposed and varying from about five to eight in number.

Base convex, concentrically wrinkled-grooved; aperture oval, well-rounded at the front; outer lip thin, margined behind by a varix; columella slightly thickened internally.

Dimensions.—Length, 12; breadth, 3; diameters of aperture, 2·25 and 1·75.

Locality.—Eocene; not uncommon in the *Turritella*-bands, Blanche Point, Aldinga Cliffs.

25. Scalaria (Hemiacirsa) polynema, *spec. nov.*

Shell subulate-turrited, stout, smooth, shining, imperforate; ordinary whorls about nine, nearly flat, feebly costated and variced, spirally striate; apex unknown.

The costæ are slightly arched, subacute, slender, separated by as wide concave interspaces, about 18 on the anterior whorls; varices broad, depressed, about six on the spire.

The spiral ornament consists of slender subacute threads, separated by equally wide incised furrows, about 12 to 15 on the anterior whorls. The suture is concealed by a narrow ante-sutural band, most conspicuous on the anterior whorls.

Base convex, concentrically lirate; aperture oval, well-rounded at the front; outer lip rather thin, margined-behind by a varix; columella slightly-thickened internally.

Dimensions.—Length, 9; width, 2; an imperfect example width, 3; height of aperture, 2; width, 1·5.

Locality.—Eocene; Bird-rock Bluff, Spring Creek near Geelong.

This species is closely related to the last, differing by its more slender and numerous costæ and liræ.

MISCELLANEOUS CONTRIBUTIONS,

Parasite of the Stick-case Moth (*Entometa ignobilis*).

Mr. Tepper records the larva of a large fly, *Tachina* sp., destructive to the caterpillars of this moth.

On the Protracted Pupation of Antheræa Helenæ.

A female example of this large moth was bred by Mr. Tepper from a caterpillar, which did not emerge from its cocoon till after the lapse of 2 years 8 months and 25 days.

Diprotodon-Remains.

A large skull, one shoulder-blade, one axis, two cervical vertebræ, one nearly complete rib-bone and a portion of the sternum have been added to the Public Museum, exhumed under the direction of Mr. Zietz from a depth of 12 feet below the surface in loam and gravel in the eroded bed of a tributary of the Baldina Creek on the edge of the Eastern Plain.

Foraminifera of the Muddy Creek-Beds.

Mr. W. Howchin reports the following species of *Polystomella* inadvertently omitted from his paper (Trans. Roy. Soc. S. Aust., vol. xii., p. 16.):—

P. striato-punctata, F. v. M. Upper bed, rare.
P. subnodosa, Munster. Upper bed, very common.
P. crispa, Linn. Upper bed, rather scarce.

Poisonous Properties of Euphoria eremophila.

Although this spurge plant has been previously reported as occurring in the Gawler Ranges, I have only met with three plants of it during the past two years at this particular place (Caroona, Lake Gilles). It has not previously been gathered here. The plant is very familiar to me, as I have seen much of it in Queensland and the northern parts of New South Wales. As W. F. M. Bailey, in his work on the Queensland flora, refers to this plant, and writes of it that it is reported to be poisonous to animals, it may be interesting if I refer to the symptoms of

poisoning which I have myself observed on sheep. The plant grows abundantly in low, swampy ground, and should sheep happen to get to it with empty bellies it causes the following symptoms :—On the second day after eating the heads are swollen, the ears drooped, and a yellowish discharge oozes through the pores of the skin. On lancing the skin, a yellowish fluid escapes. In a large percentage of the sheep affected, their ears drop off altogether, whilst others again succumb to its effects and die. I have seen as many as 500 or 600 sheep lying dead on the camp after feeding on this plant. It has not the same marked effect on sheep with full bellies as it has on those that are fasting. A number of the former, however, will suffer severely from its poisonous effects, and even die. The plant appears to be of wide distribution in the province of South Australia, according to the last published census of indigenous flowering plants, by Professor Tate (Transactions and Proceedings, Royal Society S.A., vol. XII.). Its home is essentially the more arid portions of the province, where, from its green appearance, it must often prove a tempting bait to travelling flocks.

H. Sutherland.

Fluorescence of Bursaria spinosa.

It has long been noticed that an infusion of the leaves of *Bursaria spinosa* is strongly fluorescent. On examination this proves to be due to the presence of *Æsculine*, which has been isolated in a crystalline form from the plant, and to which the fluorscence of the bark of the horse-chesnut is also due.

E. H. Rennie.

BIBLIOGRAPHY.

On the RECTIFICATION of the NOMENCLATURE of *Hectoria Pontoni*, Tepper.

Dr. F. Karsch, of the Berlin Museum, has identified the foregoing, described in these Transactions, vol. XI., with *Alectoria superba*, Brunner, described and figured in the "Journal d. Museum Godefroy," part XIV., p. 196, 1879, from a specimen obtained at Peake Downs, Queensland.

ADDITIONAL SPECIES OF AUSTRALIAN FUNGI.

The following references and translated extracts belong to species of Fungi collected in South Australia by Mr. J. G. O. Tepper, and described by Mr. G. Winter, Prof. P. A. Saccardo, and Dr. F. Ludwig in various European Scientific Journals. The list is largely an addendum to the "Notes on Australian Fungi," published in these Transactions, vol. XII., pp. 150 *et seq.* The extra-provincial records are supplied from Mueller's Fragm. Phyt., vol. II.

PANUS LATERITIUS, *Saccardo*, in Hedwigia, XXVIII., p. 125, tab. 2, fig. 4. Dimidate, sessile, orbicular-lunate, membranous, flaccid, with margin at first rather obtusely involute but soon straight, acute, tan-coloured, spotted with punctiform brick-coloured evanscent tufts. Lamellæ somewhat widely apart, few (12 to 20), entire and dimidiate, somewhat narrow, rather hard, subochraceous; basidia subterete; spores ovate-ellipsoid, apiculate at the the base 9 to 10 x 6 to 6·5, smooth, hyaline.

Allied to *P. lunatus*, Fr., and *P. cinnabarinus*, Fr.; but differs from the first by the lateritis squamulose pileus, and from the second by the colour of the pileus.

BOLETUS SUBTOMENTOSUS, *Frics.* Also in N.S.W.

TRAMETES HISPIDULA, *Berk* and *C.* Pileus scrupose-tomentellose, when young cervine-fulvous, when old darker, 2 to 3 c.m. broad, concentrically sulcate. Pores bluish-white at the edge ·75 mm. diameter. Allied to *T. hispida*, which is broader, but not so thick, and the pores are scarcely ·5 mm. diameter.

HEXAGONA DURISSIMA, *Berk.* [*Saccardo*, Bull. Soc. Myc. de France, 1890.]

STEREUM KALCHBRENNERI, *Saccardo;* S. HIRSUTUM, *Fries;* var. glaucellum, *op. cit.;* and S. CYATHIFORME, *Fries;* var. minor, are diagnosed in Bull. Soc. Myc. de France, 1890.

CYPHELLA POLYCEPHALA, Saccardo in Hedwigia, XXVIII., tab. 2, fig. 5. Growing in groups of about four to six, rarely two to three, pilei, closely fasciculate, upheld on a common stipitiform base which is subterete, whitish-brown, glabrous and incrassated upwards. Pileus urceolate, much-closed, woolly-white, minutely roughened upwards with filiform hairs 5 *u* thick; hymenium immature. A minute fungus 1 mm. thick and high.

CYPHELLA ALBO-VIOLASCENS, (*A.S.*), *Karsten.* On vine twigs.

[CYPHELLA VILLOSA (*Pers.*), *Karsten.* On decayed stems of *Cynara scolymis*, near Melbourne; coll. J. G. O. Tepper.]

BATTARREA TEPPERIANA, *Ludwig;* Bot. Centrabl., XXVII., No. 11; Bull. Soc. Myc. de France, vol. V., p. 34, pl. 5.

LYCOPERDON BOVISTOIDES, *Saccardo*, Bull. Soc. Myc. de France, 1890.

UROMYCES (UROMYCOPSIS) LIMOSELLÆ, *Ludwig;* Hedwigia XXVIII., p. 182. Æcidia scattered or united. The masses of pseudospores are whitish with an irregular margin, not deeply sunk. Spores roundish, polyhedral, colourless, smooth, of about 15 *u* diameter. The sori of the teleutospores occur among the peridia although mostly and for long covered by the epidermis, polyhedral, of a dark-brown colour. Teleutospores obovate, oblong, or club-shaped, rarely subglobular, with a yellowish-brown, thick, smooth membrane, thicker and paler at tne summit. Spores 32 to 40 *u* long, 18 to 22 *u* wide; pedicel as long as or shorter than the spore. Upon the leaves of *Limosella aquatica*, Karatta, Kangaroo Island.

UROMYCES (PILEOLARIA) TEPPERIANUS, *Saccardo;* Hedwigia XXVIII., p. 126, tab. 2, fig. 1. Teleutospores sphæroidal, depressed, cinnamon-coloured, 20 to 24 by 18 to 20 *u*, longitudinally very thinly and closely canaliculate-striate, crenulate on the margin when viewed in front, nucleate; with long bacillar stipes densely fasciculate, 40 to 60 by 3 to 5 *u*, hyaline, fixed to the base of the teleutospore by a circular hilum. Can be compared with no other species.

PUCCINIA (PUCCINOPSIS) SACCARDOI, *Ludwig;* Hedwigia XXVIII., p. 362. Æcidiæ scattered or united in groups, producing on the leaf circular patches, raised around the margin, which dry up in the interior, of a brownish or yellowish tint, from 2 to 4 mm. in diameter. The pseudo-peridia are dish-like, white, with deeply-impressed margin, about 215 to 325 *u* in diameter; peridial cells finely verrucose, 18 to 25 *u* long and 15 to 18 *u*

broad. Spores polygonal, pale orange, 13 to 15 *u* diameter. Teleutospores roundish or oblong, occasionally grouped around those of the peridia, confluent on the peduncles, &c., generally covered by the epidermis at the border, black. Spores raised upon a pedicel gradually dilating upwards and passing into the lower spore-cell, 50 to 63 *u* long. Lower spore-cell oblong, compressed (laterally dilated to about 18 *u*), about 29 to 33 *u* long, brown; upper spore-cell wider, almost globular, quadrate or rectangular, with much-enlarged apex, which is blackish-brown, 20 to 25 *u* wide and 23 to 30 *u* long. Upon *Goodenia geniculata*, Tanunda; October 29, 1887.

PUCCINIA MALVACEARUM, *Montague*. Also in V.

USTILAGO TEPPERI, *Ludwig;* Bot. Centralblatt, No. 11, 1889. See Trans. Roy. Soc., S. Aust., vol. XII., p. 153.

UROMYCES DIGITATUS, *Winter;* Revue Mycologique, October, 1886. Acervulus solitary, snowy-white, minute, veiled by the finally cleft epiderm, placed in the centre of a black rotund or orbicular, determinate macula, bounded by a very narrow fuscous line, about ·5 to 1 mm. diameter. Uredospores numerous, ovate or elliptical, golden-brown, densely verrucose, with membrane at the apex sometimes a little thickened, 32 to 35 *u* long and 20 to 25 *u* thick, supported by a hyaline very fragile stipe. Teleutospores cuneate-oblong, on a long persistent hyaline stipe, attenuate at the apex, very much thickened, and bearing three to six digitiform erect or divaricate, often recurved, obtuse processes, at first golden, at length through pale to hyaline, 50 to 60 *u* long and 14 to 18 *u* thick. On living leaves of *Acacia notabilis*, near Gawler, July 1885.

UROCYSTIS MUELLERIANA, *Thun.* On *Juncus* sp.

PHRAGMIDIUM BARNARDI, *Plowr. & Wint.*; Revue Mycylogique, Oct., 1886, p. 2; on the leaves of *Rubus parvifolius*.

DIMEROSPORIUM LUDWIGIANUM, *Sacc.* Hedwigia XXVIII., p. 127. Mycelial maculæ amphigenous, dilutely fuliginous, scarcely determinate, appressed; perithelia here and there crowded, globular, astomous, superficial, 75 *u* diameter, opaquely fuliginous; hyphæ radiating, concolorous, septulate, unequal, laxly interwoven, appressed, girt at the base; asci broadly elevate-fusiform, somewhat obtuse at the apices, very shortly stipitate, 25 to 28 x 9 to 10 *u*, spuriously paraphysate, octosporous; sporidia distichous shortly fusiform, uniseptate, not constricted, 10 to 12 x 3 *u*, hyaline. On wilted leaves of *Lagenophora Billardieri*, Mount Lofty. Allied to *D. venturioides*, Sacca. and Berla, from which it differs by the appressed hyphæ, by the black contexture of the perithecium, by the perfectly hyaline sporidia, &c.

NUMMULARIA PUSILLA, *Sacc.*; Hedwigia, XXVIII., p. 127. Stromata very small for the genus, strictly applanate, blackish, elliptical oblong or sinuous, 2 mm.-diameter, or 4 to 5 by 2 mm., scarcely ·5 mm.-thick, soon becoming superficial by the seceding periderm; everywhere fertile, blackish, somewhat shining, with a rectangular margin, the periphery vertical; disk smooth; ostioles punctiform, somewhat crowded, with the small not prominent margin visible only under a lense; perithecia parallelly crowded together, roundly oblong, often unequal, $\frac{1}{3}$ mm. high and $\frac{1}{6}$ mm. thick; asci cylindrical (soon nearly absorbed); sporidia 8, broadly fusiform, rather straight, somewhat pointed at each end, 18 to 22 by 6 *u* in diameter, variously guttate, fuliginous. On dead branches of *Bursaria spinosa*, at Callington. It seems to be allied to *N. cyclisea*, Mont., Syll. Pyr., I., p. 370, to *N. microsticta*, Mont., Syll. Pyr., I., p. 371, to *N. scutata*,, B. & C., Syll. Addit., p. 57, and to *Hypox. stigmoides*; but well distinguished by the form and small size of the non-pruinose stromata, by the largish non-caudate sporidia, &c.

SEPTORIA BROMI, *Sacc.*, Syll. Sphaeropt, p. 562. Perithecia, 150 *u* broad, widely perforate; sporules tortuous, continuous 40 to 50 by 1 to 1·5 *u*. Differs from *S. Koeleriæ* by the perithecia three times larger, the spots obsolete. On the sheaths and leaves of grasses at Murray Bridge.

PLEUROTUS CHÆTOPHYLLUS, *Sacc.*, Hedwigia, XXVIII., p. 125. Dimidiate, obovate-spathulate, thin, very shortly stipitate, with acute at length rather straight margin, densely shortly white-tomentose; stipe rather thick, rugulose; lamellæ narrow, very crowded, generally entire, colour from white to tan, reaching the stipe, everywhere roughened (under a lense) with small fusiform (cystid) subochraceous setulæ, 30 to 40 by 12 to 15 *u*; spores elliptic-reniform, hyaline, 5 by 3 *u*, smooth. On branches in South Australia. Pileus with stipe, 15 to 20 mm. long, 12 to 14 mm. wide, stipe 3 mm. thick. The cuticle under the hair blackens in drying. Allied to *P. limpidioides*, Karst., *Sacc.*, Syll. V., p. 365, but the lamellæ are setulose, not conjoined, everywhere narrow, spores reniform, &c.

POLYSTICTUS SANGUINEUS *(L.)*, *Fr.* On trunks of trees, Tandappa, near Lake Eyre.

POLYSTICTUS CINNAMOMEUS (*Farq.*), *Sacc.* On the base of the trunks of *Eucalyptus obliqua*.

The diagnoses of the following species are published in Bull. de la Soc. Myc. de France, 1890:—

Ceriomyces incomptus, *Sacc.*; a metagenic form of some *Polyporus*.

Lycoperdon novistoides, *Sacc.*

Tylostoma pulchellum, *Sacc.*

Polystigma Australiense, *Sacc.*; on Leguminosæ.

Poria mollusca, *Fr.*

Polyporus eucalyptorum, *Fr.*; an abnormal flask-shaped form. Also W.A.

Xylopodium australe, *Berk.*; S.A., V., N.S.W.

Polystictus lilacino-gilvus, *Berk.*; P. parvulus, *Kl.*; P. cladonia, *Berk.*

Fomes fulvus, *Fr.*; var.

Naucora conspersa, var.

Didymella cladophila *(Niessl)*, *Sacc.*, and Chætomella brachyspora, *Sacc.*, growing on vine twigs.

Revision of the Thelephoreæ (Order Hymenomycetes). By Masse, Journ. Lin. Soc., vol. XXV., 1889-90. Includes some additional species, and some new to science, for South Australia.

New Species of Flowering Plants inhabiting Extra-Tropical South Australia.

Micrantheum demissum, *F. v. Mueller*, Victorian Naturalist, Sept., 1890 (*M. hexandrum* of South Australian lists, but not of J. Hooker).

Bassia Luehmanni, *F. v. M.*, op. cit., Aug., 1890.

Bassia Tatei, *id.*, Sept., 1890.

Helipterum Fitzgibboni, *id.*, June, 1890.

Helipterum Jesseni, *id.*, Aug, 1890.

Helipterum Trœdeli, *id.*, Oct., 1890.

Eremophila Battii, *F. v. M.*, Proc. Lin. Soc., N.S.W., June, 1890.

Eucalyptus Lansdowneana, *F. v. Mueller* and *J. E. Brown*, in "Forest Flora of S. Aust.," part 9, 1890.

Record of Undescribed Plants from Arnheim-Land, *F. von Mueller*, in Proc. Roy. Soc., N.S. Wales, July, 1890.

Dunbaria singuliflora, *n. sp.*; Clerodendron Holtzei, *n. sp.*; Utricularia Wallichiana, *Wight*; U. Singeriana, *n. sp.*; Aneilema vaginatum, *R. Brown*; Sida Holtzei, *n. sp.*; Tylophora Leibiana, *n. sp.*; Hoya australis, *R. Brown*; Habenaria Holtzei, *n. sp.*

ADDITIONS to the INSECT-FAUNA of SOUTH AUSTRALIA will be found recorded in the following papers :—

a. New Species of Saw-flies. By W. W. Froggatt, Proc. Lin. Soc., N.S.W., Sept., 1890.

b. New Species of South Australian Coleoptera. By T. Blackburn, Proc. Lin. Soc., N.S.W. ; Feb., June, and Sept., 1890.

c. Revision of the Genus Heteronyx. By T. Blackburn, *op cit*, Feb. and April, 1890.

d. New Species of Diptera (Nematocera). By F. A. A. Skuse, Proc. Lin. Soc., N.S.W., Sept., 1890.

e. Revision of the Australian Lepidoptera (Hepialidæ and Monocteniadæ). By E. Meyrick, Proc. Lin. Soc., N.S.W., April, 1890.

f. New Carabidæ. By T. G. Sloane, Proc. Lin. Soc., N.S.W., April, 1890.

OLDER TERTIARY GASTROPODS OF AUSTRALIA.

Parts I. and II. of the above, by Prof. Tate, in Trans. of this Society, vols. X. and XI., are reviewed by M. Cossmann in "L'Annuaire Geologique Universel," vol. V., 1889, pp. 1088-1091.

The reviewer remarks that the fauna has an incontestable analogy with that of the Paris Basin, and advises more frequent comparisons with the European species and with those of the Alabama basin ; and adds that if the Australian fauna does not contain species in common with these, yet it occupies at least a sort of middle place between them which are so widely separated geographically. M. Cossmann's criticisms on the affinities of some species to those of the Paris basin and on their generic location having a high value, are here repeated :—

Typhis laciniatus is comparable with *T. tubifer*, Sow., though the varices are more festooned. *Murex rhysus* has some analogy with *M. bispinosus*, Sow. ; and *M. calvus* has a slight resemblance to *M. tricarinatus*, Lamk. *Murex (Chicoreus) Hamiltonensis* and *M. irregularis* having an absolutely different ornamentation cannot belong to the same group. *Murex (Phyllonotus) Eyrei* and *M. sublævis* much resemble the Parisian *Muricidea*, notably to *M. Steuri*, Cossman. In *Ocinebra* are some *Muricidea*, as *M. biconicus*, which has some analogy with *M. Bernayi*, Desh., or some *Muricopsis* as *M. alveolatus* and *M. crassliratus*, which resemble *M. Auversiensis*, Cossmann. Of *Trophon*, only *T. icosiphyllus* makes an approach to the characters of the genus, the others appear to belong to *Muricidea* or *Muricopsis*. Of the *Tritons*, the first 15 (except *T. ovoideus*, which resembles our *Simpulum planicostatum*) are of very typical species and very distinct from those of the Paris basin. *Epidromus tenuicostatus*

seems closely allied to *Triton turriculatus*, Desh., but *E. citharellus* is absolutely identical with *Plesiotriton volutella*, Lamarck *(Cancellaria)*.

Of the large family Fusidæ, we find in Mr. Tate's work a first tentative reform of the genus Fusus, in which the older authors, and especially Deshayes, have classed the most heterogeneous species; *F. incompositus*, *F. bulbodes*, and *F. Tateanus* are Clavellæ recognisable by their pullus and ornamentation; *F. tholoides* and *F. Aldingensis* should constitute a new subgenus, without analogy in the Paris basin, characterised by the tectiform and costulated pullus; the form and ornamentation of *F. aciformis* and *F. hexagonalis* recall very much those of *F. funiculosus*, Lamarck, which is the type of our new genus Latirofusus, it is probable that *F. aciformis* is a synonym of the Parisian species.

Siphonalia spatiosa has analogy with *S. Mariæ*, Mellev., though the canal is not so much curved; *Sipho styliformis* and *S. asperulus* appear to be doubtfully classed.

The seven species of Fasciolaria are very characteristic, but have no analogies in the Paris-Basin. Some of the species of Peristernia should belong to Latirus; *P. actinostephes*, which resembles *F. subaffinis*, D'Orb., belongs to our new subgenus *Latirulus*.

The five species of Pisania consists of a Latirus (*P. purpuroides*), a Euthria (*P. rostrata*), and three of Tritonidea.

Voluta sarissa is extremely allied to *V. angustata*, Desh., *V. lirata* somewhat recalls *V. Fredrici*, Bayan, and *V. crassilabrum* has some analogy with *Septoscapha variculosa*, Lamk., sp. *Mitra Dennanti* is irreconcilable with the typical species; *M. alokiza* is allied to *M. cupressina*; *M. complanata* and *M. ligata* have a resemblance to *M. mixta*; among the species of Costellaria are some which it is impossible to separate from Fusimitra, Conrad, such as *M. leptalea*, *M. paucicostata*, *M. terebræformis*, whilst *M. subcrenularis* is very allied to *M. tetraptycta*.

Ancillaria orycta recalls completely *Amalda excavata*, Cossmann. *Harpa tenuis* may be compared with *Eocithara mutica*.

Of the Cancellariæ, the following find places in some of the subgenera recently established by M. Jousseaume :— *C. Wannonensis* is typical, *C. calvulata* and *C. laticostata* to Bivetopsis; *C. gradata* and *C. ptychotropis* to Bivetia; *C. epidromiformis* and *C. exaltata* to Sueltia; *C. modestina* to Merica; *C. turriculata*, *C. Etheridgei*, *C. caperata*, *C. capillata*, *C. micra* and perhaps *C. semicostata* to Narona.

The Terebræ are for the most part related to those of our supra-tertiary beds, not one of them resembles *T. plicatula*, Lamk., the only-known species in the Paris-Basin.

Cassis exigua is allied to *C. tertiliosa*.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1889-90.

ORDINARY MEETING, NOVEMBER 5, 1889.

Dr. STIRLING in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited from Central Australia, *(a)* the fruit of a *Grevillea* tree, said to be that of the "blood-wood tree;" *(b)* a black substance from the floors of certain caves, supposed to be excremantitious matter; *(c)* a piece of white, light substance, from a quarry near Mount Sonder, which had much the appearance of a stearate of lime; *(d)* piece of quartz-crystals and hæmatite from Mount Sonder; *(e)* specimens of honey ants; *(f)* nest and tunnels of certain ants apparently made in the resinous exudations of a species of *Triodia*, together with sample of surrounding sand.

G. GOYDER, Jun., exhibited from Mount Ogilvie specimens of *Gersdorfitte*, or arsenical nickel ore; *Annabergite*, the same oxidised; *Smaltite*, or arsenical cobalt ore; and from near Blinman, *Erythrite*, or arsenical cobalt ore oxidised, and a specimen of *Graphite* and *Sulphur*.

A. ZIETZ exhibited a collection of native weapons from Cooper's Creek, showing elaborate carving; also portions of a skull of an extinct marsupial, *Thylacoleo*, or Australian pouched lion, which had been found in excavating a dam at Yam Creek, Bundaree, embedded in red clay and associated with the bones of a *Diprotodon* and a yet not identified species of kangaroo. The bones of the *Diprotodon* were as follows:—Base and anterior portion of one skull, two scapulæ, half of a pelvis, a number of vertebræ, of which one, the atlas, was very well preserved, and portions of ribs. All the above fragments apparently belonged to one animal.

PAPERS.—"Soaring of the Hawk," by T. W. KIRK, F.R.M.S.; "Additional List of S.A. Polyzoa," by Dr. MCGILLIVRAY, Corresponding Member.

D. B. ADAMSON stated that he had observed no alteration in the shape and position of the craters of the moon.

ORDINARY MEETING, DECEMBER 3, 1889.

Dr. STIRLING in the chair.

BALLOT.—Jas. H. Loughhead was elected a Fellow.

EXHIBITS.—Professor TATE, F.G.S., exhibited coniferous wood, showing woody structure, from the Cretaceous deposits at Boorthanna, in the Lake Eyre basin, forwarded by W. Baggaley, C.E., the Resident Engineer of the Great Northern Railway extension works. The microscopical preparations revealed very distinct large glands in a single series, as in recent species of *Pinus*.

Dr. STIRLING showed the skull of a native, presenting a marked resemblance to the celebrated Neanderthal skull, and presenting a very ape-like appearance.

PAPERS.—"Description of a New Eucalypt," by Baron F. von MUELLER and J. E. BROWN, Conservator of Forests; "Fossil Corals of the Cambrian Epoch," by R. ETHERIDGE; "Whales and Dolphins of the S.A. Coast," by A. ZIETZ; "Flora and Geology of Southern Yorke's Peninsula," by Professor TATE, F.G.S.; "Descriptions of Australian Lepidoptera," by E. MEYRICK.

ORDINARY MEETING, MARCH 4, 1890.

WALTER HOWCHIN, F.G.S., in the chair.

RESIGNATION.—The resignation of W. B. POOLE as a member of the Council owing to his leaving the province to visit Europe was accepted with regret, and a hearty vote of thanks was passed to him for his services in the interests of the Society.

ELECTION.—Professor BRAGG was nominated to fill the vacancy in the Council, and was unanimously elected.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited a fruit from Roebuck Bay, W.A., supposed to belong to a species of *Adansonia*, the kernel of which is eaten by the natives; also the fruits of *Richardia Æthiopica*. He referred to the fruiting of *Yucca aloeifolia* at Roseworthy Farm as showing the existence of some special insect as the direct instrument of fertilization.

J. E. BROWN exhibited flowering branchlets and fruits of a new Eucalypt *(E. Lansdowneana)* from Gawler Ranges.

PAPERS.—"On the Flnorescence of *Bursaria spinosa*," by Professor RENNIE; "Notes on Extinct Australian Mammals," by A. ZIETZ; "Notes on a Parasite of *Entometa ignobilis*," by J. G. O. TEPPER, F.L.S.; "Notes on the Life History of *Antheræa Helenæ*," by J. G. O. TEPPER, F.L.S.; "List of Australian Fungi," by Dr. LUDWIG.

ORDINARY MEETING, APRIL 1, 1890.

Dr. STIRLING in the chair.

BALLOT.—GREGORY BOARD, metallurgist to the Dry Creek Smelting Works, was elected a Fellow.

EXHIBITS.—J. G. O. TEPPER, F.L.S., showed some aggregations of sand which had the outward appearance of potatoes, found amongst the roots of sedges at the Murray Bridge. It was suggested by Professor Tate that they might be casts of the fungus, *Mellita australis*.

Professor TATE, F.G.S., exhibited a specimen of the Belemnitoid genus of *Spirulirostra*, from the Old Tertiary beds at Spring Creek, near Geelong, Victoria. The genus has hitherto been known only by a single species from the Turin tertiaries. The species exhibited was distinct from that.

PAPERS.—"Notes on Symptoms of Poisoning in Sheep by *Euphorbia eremophila*," by H. Sutherland; "Notes on Plants from Roebuck Bay, W.A., by J. G. O. TEPPER, F.L.S.; "Report on Plants from Central Australia, collected by W. T. Tietkins, F.R.G.S.," by Baron F. von MULLER and Professor TATE, F.G.S.

ORDINARY MEETING, MAY 6, 1890.

Dr. STIRLING in the chair.

BALLOT.—Rev. WILLIAM GRAY, New Hebrides, was elected a Fellow; ROBERT ETHERIDGE, Palæontologist, Australian Museum, Sydney, was elected an Hon. Fellow.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited specimens of entomology, namely *Antheræa Helenæ;* a parasite fly, *Trachinidæ*, on *Entometa ignobilis*, with its proper case, causing the premature death of the latter; specimens of *Chærocampa scrofa*, male and female, chrysalis case and larva. The larva was forwarded from Innamincka by W. Lamb. This moth is becoming much scarcer. Also *Chærocampa celeris*, male and female, chrysalis and larva, probably introduced with vines from France, on the leaves of which the larva feeds. It is becoming commoner, being reported by W. H. Cavenagh and F. Bevilaqua of Tanunda. The chrysalis stage is from ten to sixteen days in summer, but much longer in winter. Also specimens of *Chærocampa roseo-maculata*, previously only known from New South Wales, but now reported as common about Adelaide, and by W. Lamb at Innamincka, feeding on *Convolvulus erubescens* and *C. sepium;* also another *Chærocampa* species, probably new, from Silverton, reported by F. A. Fiveash, and from Oladdie, by H. McGregor, male and female, chrysalis and larva, the latter from Innamincka (W. Lamb),

passed into chrysalis stage February 13, 1889, whence the imago emerged February 25 of same year.

W. HOWCHIN, F.G.S., exhibited a number of water-worn pebbles from a thick bed of conglomerate in the Barossa Range, three miles east of Williamstown, included in highly altered mica and hornblende schists and feldspathic grits, tilted to an angle of 75°; the beds are several hundred feet thick and the pebbles are mainly quartz and feldspathic grit; the pebbles possessing an argillaceous constituent were affected by the metamorphic action in a similar way to the argillaceous matrix.

Rev. THOS. BLACKBURN, B.A., showed specimens of Pele's hair and volcanic products collected by him from the crater of Kilauea, Hawaii.

PAPERS.—"Additions to S.A. Coleoptera," by Rev. THOS. BLACKBURN, B.A.; "Fossil Remains of Australian Mammals," by A. ZIETZ.

ORDINARY MEETING, JUNE 3, 1890.

Dr. STIRLING in the chair.

PAPER.—"Cremation," by Dr. WYLDE.

MOTION.—After a discussion, the following motion was carried:—"That the Society is strongly of the opinion that the present mode of disposal of the dead by earth burial is fraught with danger to the health of the community, and it recommends that cremation be permitted by law."

ORDINARY MEETING, JULY 1, 1890.

Dr. STIRLING in the chair.

BALLOT.—Capt. Anstruther Thompson was elected a Fellow.

MOTION.—It was proposed by Prof. TATE, F.G.S., and seconded by S. DIXON—"That the Society desires to draw the attention of the Royal Society of New South Wales to the vast economic and scientific advantages to Australia by a Geological Surveyor being stationed at Broken Hill; and respectfully request that that Society will bring the subject under the consideration of the New South Wales Government."

The motion was carried with the proviso that Professors Tate and Rennie prepare a draft letter to the above effect.

EXHIBITS.—W. HOWCHIN, F.G.S., exhibited the skulls of two aboriginals. One of these was a well-preserved skull of a woman of the extinct Adelaide tribe, the remains having been exhumed from the sandhills near Plympton. The skull showed a deep indentation in front, as though from a blow by a waddy. As the remainder of the skeleton was said to have been marked by

syphilis, the date of death would probably be within the past 50 years. The second skull was from Meningie. It was of the dolichocephalic type, with the frontal angle very low, the orbital ridges very thick and prominent, and the calvarium had attained the thickness of fully an inch in places. The skull was presented to the museum by the exhibitor. A. W. FLETCHER, B.Sc., exhibited Cambrian fossils from Ardrossan and Curramulka, Yorke Peninsula. From Ardrossan there were of the trilobita the genus *Dolichometopus;* and of the order pteropoda the genera *Hyolithes* and *Stenotheca.* From Curramulka various trilobitæ, and an invaginated *Hyolithes.* Calcite, gypsum, fluorspar, copper- and iron-pyrites were found as accessory minerals with the limestone. Prof. TATE spoke of the interest attached to the specimens, and stated that the finding of the fossiliferous limestone at Curramulka rendered it probable that there was a bar of Archæan rock extending across Yorke Peninsula from Ardrossan to Port Victoria. The invaginated pteropod, *Salterella* or *Hyolithes*, was strictly Cambrian in its range, and with its associates fixed very definitely the geological horizon of the specimens. The Cambrian limestones of the Flinders Range exhibit relationship with the Ardrossan section in its corals, and the Curramulka section in its trilobites.

J. J. EAST exhibited a specimen of asbestos obtained by J. L. Johnson from Nackera, and a number of mineralogical specimens from Mount Crawford.

J. G. O. TEPPER, F.L.S., exhibited cocoons and moths of the family Arctiidæ, sent from Mount Gambier by W. Weld, who observed them feeding on *Acacia longifolia;* also the cocoons of *Cossus cinereus*, and a specimen of ichneumon which is parasitic on it. The cocoon had an ovipositor inserted into it, and contained about 50 of the parasites. Also a collection of 80 species of Australian lichens which had been identified by the Rev. F. R. M. Wilson, of Victoria.

ORDINARY MEETING, AUGUST 5, 1890.

Dr. STIRLING in the chair.

EXHIBITS.—A. ZIETZ exhibited a specimen of *Glareola grallaria*, a bird new for South Australia, about the size of an English starling, whose general habitat is Central Australia. In 1884 it was for a few months very numerous about Goodwood, and then disappeared altogether. Also a species of petrel, *Puffinus carnipes*, picked up on the Glenelg beach in 1888. According to Dr. Ramsay's list it is only found on the western and south-western coasts. Also a specimen of musk-duck, *Biziura lobata*, from Cooper's Creek, forwarded by W. Lamb; it was much larger

than the species frequenting the River Murray. Collection of native weapons, namely, a peculiarly-shaped boomerang from Roebuck Bay, W.A., used for killing fish, spear-heads from Western Australia made from telegraph insulators. J. G. O. TEPPER, F.L.S., a collection of weevils; Prof. TATE, F.G.S., a collection of shells from the Dry Creek-bore, in illustration of his paper.

PAPERS.—"Estuarian Foraminifera of the Port Adelaide River," by W. HOWCHIN, F.G.S. "Geological Section of the Dry Creek-bore," by Prof. TATE, F.G.S.

ORDINARY MEETING, SEPTEMBER 2, 1890.

Dr. STIRLING in the chair.

BALLOT.—Alfred Watkins Fletcher, B.Sc., was elected a Fellow.

EXHIBITS.—Dr. STIRLING exhibited a specimen of teal of brilliant plumage of rare occurrence, *Anas castanea*. He did not know the locality from which it came, but several members had seen specimens in various parts of the province. The exhibitor did not agree with Mr. Gould in considering that it was only the nuptial dress of the male of the ordinary teal; he was satisfied that it was a distinct species.

A. ZIETZ showed six specimens of fresh-water fish from Cooper's Creek, forwarded by W. Lamb, of Innamincka; also specimens of *yuntha*, being oval pieces of wood used by the young male aborigines in certain of their ceremonies. Also a painted wooden post sent by Inspector Foelsche from the Northern Territory. It was used to mark the ground for holding a corroboree in honour of the dead.

MOTION.—In response to a circular-letter from the Royal Geographical Society, Melbourne, stating that Barons Nordenskjold and Oscar Dickson had offered to subscribe £5,000 towards defraying the expense of an Antarctic Exploring Expedition, provided a similar amount was subscribed in Australia, it was moved by S. DIXON, and seconded by J. G. O. TEPPER, F.L.S., and unanimously carried—"That this Society learns with pleasure of the magnificent offer of Barons Nordenskjold and Oscar Dickson to defray half the expense of an expedition to the Antarctic regions. It heartily supports the action of the Australian Antarctic Exploration Committee in appealing to the general public throughout the Australian colonies for subscriptions to supplement the £5,000 already promised."

PAPER.—"Some New Fungi," by J. G. O. TEPPER, F.L.S.

ANNUAL MEETING, OCTOBER 7, 1890.

Dr. STIRLING in the chair.

AUDITOR.—D. J. Adcock was proposed and unanimously elected to audit the accounts of the past year.

EXHIBITS.—Prof. TATE, F.G.S., showed a species of land snail, *Helix ericetorum*, common to and inhabiting open uplands in England, from Southern Yorke Peninsula, where it is found plentifully in life.

W. HOWCHIN, F.G.S., exhibited a cylindrical stone from the eastern flanks of the Mount Lofty Range, that simulated closely the arenaceous casts of the coal measure-plants, particularly lepidodendron.

A. ZIETZ showed two specimens of a large insectivorous bat, about two feet in diameter, from a cave near Alice Springs, forwarded by Inspector Besley. The genus Megaderma has not been previously observed as occurring in Australia. The largest species hitherto known, *Molossus australis*, is only one foot in diameter. Also, a live specimen of a beautifully marked small poisonous snake, *Vermicilla Bertholdi*, from Central Australia. Also a specimen of *Phyllopteryx eques*, with the ova attached to the belly.

The annual report and balance-sheet of the Society were read and adopted.

The annual reports and balance-sheets of the Field Naturalists' and Microscopical Sections were accepted.

The Council for the ensuing year was elected as follows:—President, Rev. Thomas Blackburn, B.A.; Vice-Presidents, Prof. Tate, F.G.S., and W. Howchin, F.G.S.; Hon. Treasurer, Walter Rutt, C.E.; Hon. Secretary, W. L. Cleland, M.B.; Members of Council, Prof. Bragg, M.A., Prof. Rennie, D.Sc., E. L. Stirling, M.D., H. T. Whittell, M.D., D. B. Adamson, and Samuel Dixon.

The PRESIDENT (Dr. Stirling) then vacated the chair in favour of the President-elect (Rev. Thos. Blackburn, B.A.), and read an address "On Weissman's Theory of Heredity."

It was carried unanimously that the address be printed.

PAPERS.—"Coleoptera of Australia, Pt. IV.," by Rev. THOS. BLACKBURN, B.A. "Supplemental Notes of the Flora of Central Australia," by BARON F. v. MUELLER. "On the Geological Structure of the Adelaide Plains, with especial reference to the Croydon Bore," by Prof. TATE, F.G.S. "Gasteropods of the Older Tertiary of Australia, Part III.," by Prof. TATE, F.G.S.

ANNUAL REPORT.

The Council has the pleasure of reporting that the work of the Society has been carried on successfully during the past year.

The exhibits have been of a varied and interesting nature, most of them having been lent for the occasion by the S.A. Museum, through the instrumentality of the Hon. Director (Dr. Stirling, President of the Society). Respecting many of them Messrs. Zietz and Tepper supplied interesting remarks. The Council regrets that greater interest is not taken by the public in these exhibits, which are of great scientific value, and in some cases unique. The descriptions which accompany their exhibition also invests them with an interest that is frequently wanting on a mere inspection in the museum cases. The Council feels that these efforts on the part of exhibitors to make the meetings interesting deserve greater appreciation than they have received.

During the past year five Fellows have been elected, and one Corresponding Member transferred to the list of Fellows. The Council has also thought proper to recommend the Society to confer its highest mark of appreciation for scientific labours on Mr. Robert Etheridge, of the Sydney Museum, by creating him an Hon. Fellow. This recommendation has been unanimously endorsed at a monthly meeting.

The Council has the melancholy duty of reporting the death of two of the Hon. Fellows of the Society during the past year, namely, that of Col. Egerton Warburton and the Rev. J. E. Tenison-Woods.

Col. Egerton Warburton was elected an Hon. Fellow in 1858, and had thus been a member of the Society for more than 30 years. He arrived in South Australia in 1855, from India, and was almost immediately appointed Commissioner of Police. His military training and love of adventure led him early to enter upon that field of exploration of the three unknown portions of the province, with which his name will be ever inseparably connected. As early as 1857 he led a party to the arid and rugged regions of the Gawler Ranges, and in 1860 he examined the country around the Head of the Great Australian Bight, and penetrated in various directions from the coast some 60 miles inland. In 1873 he was appointed to the command of an expedition which traversed the country north of Lake Amadeus, eventually reaching the coast of Western Australia, after he and his party had endured great privations. Such were some of the labours of

Col. Egerton Warburton, who, although he never claimed to be a scientific man in the ordinary meaning of the term, yet possessed the qualities that belong to all imbued with the truly scientific spirit, namely, a love for truth and knowledge, enthusiasm in its pursuit, and untiring energy towards its acquisition.

Rev. J. E. Tenison-Woods, F.L.S., F.G.S.—No heavier loss has this year befallen the Scientific Societies of Australasia than the death of this naturalist. Not only was he one of the foremost Australasian naturalists, but to very many of us he was far more as a dear personal friend, a delightful companion, and a skilled adviser. He was born in 1832, was ordained in the Catholic faith in 1856, and spent a few years in charge of a pastoral diocese in the south-east of this colony. Since then his ministerial duties led him to Tasmania and New South Wales. In 1883, he visited Singapore and the Malay Peninsula, and subsequently passed through the Phillipines, Java, Borneo, and the Northern Territory of South Australia, returning to Sydney in 1886; but during that expedition he contracted a malarial disease, which terminated fatally towards the end of last year. Though at all times a scientific enthusiast, he was nevertheless the devoted priest, and as a preacher he was acknowledged to be singularly earnest and powerful—his fine presence and elocutionary power intensifying his influence. As a scientist his life became a part of the scientific progress and history of Australasia, labouring with equally good results in Geology, Botany, Palæontology and Zoology. He was honoured by all the leading Scientific Societies of Australasia; and at an early period of his scientific career became a Fellow of the Geological and Linnean Societies of London. He was awarded the Clarke-Medal of the Royal Society of New South Wales, and gained one of the same Society's medal for his remarkable paper on the presence of visual organs in the test of certain Mollusca. His early scientific work was the outcome of his residence in the South-East; and his pioneer geological work is in the form of an octavo volume, published in 1862, entitled "Geological Observations in South Australia." In 1865 and 1866, he communicated four papers to the Adelaide Philosophical Society on the Geology and Palæontology of the Tertiary Rocks of South Australia. He lent valuable aid to this Society at a critical period of its career by infusing a higher scientific character to its proceedings; four papers adorned the pages of the first three volumes of its Transactions. In 1877, this Society elected him an Honorary Fellow. He is botanically commemorated by *Styphelia Woodsii*, F. v. Mueller, zoologically by *Thalotia Woodsiana*, Angas, palæontologically by *Echinus Woodsii*, Laube, *Palæoseris Woodsii*, Duncan, *Triton Woodsii*, *Marginella Woodsii*, *Cylichna Woodsii*, *Leda Woodsii*, *Terebratella Woodsii*, and

Magasella Woodsiana, Tate. As a small tribute of respect t one who has done much for the good of religion and laboured s vigorously for the science he loved, and also for the communit in general, in whose interest he sacrificed his valuable life, Memorial Tombstone has been erected over his grave by publi subscription.—R.T.

These are the only deaths the Council has to report; but ther have been several resignations of Fellows from varying causes The membership of the Society consists at the present time of 1 Hon. Fellows, 98 Fellows, 14 Corresponding Members, and 1 As sociate. Your Council is of opinion that this membership should be larger than it is, for it is assured that there are many who take an interest in scientific matters scattered throughout the country districts. If all with these tastes would but identify themselves with the Society and endeavour to contribute to its work, a great impetus would be given to the acquisition and diffusion of scien tific knowledge. A useful body of workers would also in the course of time be formed, and of these some might be expected to aid in the investigation of the many interesting problems of natural science which still await solution in Australasia.

The Field Naturalists and Microscopical Sections continue to thrive, and their annual reports and balance-sheets are appended herewith. Special notice may again be directed to the Supple mentary Report of the Field Naturalists' Section on the Native Flora and Fauna, and to emphasise the necessity of the continued strenuous efforts of the scientific public to strengthen the hands of those who during the past year have achieved something, but who are yet far from having, even approximately, gained all that is necessary to be obtained. The Sub-Committee is to be con gratulated on the past success of its efforts, as the Council is aware of the difficulty with which it is had to contend.

Your Council views with satisfaction the healthy growth and progress of the Boys' Field Club and the Natural Science Classes of the School of Mines. It feels that from these there will be in time strong reinforcements to the ranks of scientific workers.

The Library of the Society continues to be enriched by a large number of valuable scientific periodicals and monographs, but your Council is far from satisfied with the present conditions under which the books have to be kept. It had hoped that by this time arrangements might have been made to have had them so placed in some portion of the Public Library that members could have had access to them at any time during the day. The Council feels that the present unsatisfactory condition cannot be allowed to continue, but that every effort must be made to place at the disposal of the Fellows the Library in a more efficient way. The earnest attention of the Council, you are about to elect,

should be directed to this point. Two new exchanges have been added to the list, namely, the Geological Society of Stockholm, and the American Philosophical Society of Philadelphia.

This Council has the further satisfaction of reporting that the work of the Society continues to maintain its previous high character; and that it has authorised the expenditure of £60 to illustrate Dr. Stirling's description of the new marsupial, which has been named by him, *Psammoryctes typhlops;* and £33 for plates to illustrate a further contribution to the gastropods of the Older Tertiaries of Australia, by Prof. Tate. The Council would direct the attention of the public to the heavy expenditure which the publication of original matter necessitates, and would suggest that the funds be increased by all joining the Society who are interested in science.

During the past year the following motions of general or public interest have been passed by the members at the ordinary meetings:—

1. That the present method of disposal of the dead by earth burial is fraught with danger to the health of the community, and that it recommends that cremation be permitted by law.

2. Expressing an opinion that the Royal Society of N.S.W. should memorialise its Government as to the vast economic and scientific advantages to Australia of stationing a Geological Surveyor at Broken Hill.

3. That the Society heartily supports the action of the Australian Antarctic Expedition Committee in appealing to the general public of Australia for subscriptions to supplement the £5,000 promised by Barons A. E. Nordenskjold and Oscar Dickson.

During the year a vacancy occurred in this Council owing to the resignation of Mr. W. B. Poole, who desired to visit Europe. This was filled by the election unanimously of Prof. Bragg at the following monthly meeting.

The statement of receipts and expenditure by the Hon. Treasurer (W. Rutt, Esq., C.E.), will show that the finances of the Society stand upon a sound basis.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£ s. d.	£ s. d.	Cr.	£ s. d.	£ s. d.
October 1st, 1889.			By Cost of Transactions—		
To Balance brought forward		293 19 3	Printing and Binding (1½ vols.)	97 0 0	
" Subscriptions—			Illustrating	22 10 0	
Royal Society	80 16 0		Editing and Publishing (1½ vols.)	6 19 7	
Field Naturalists' Section ...	20 0 0				126 9 7
Microscopical Section	8 10 0		" Wages—		
		109 6 0	Caretaker and Occasional Assistance		1 19 6
" Government Subsidy		97 18 6	Printing, Postage, and Stationery		10 10 10
" Interest...		9 8 2	Advertising		4 14 7
			Library—Freight, &c. of Books		0 10 9
			Field Naturalists' Section—Grant		25 0 0
			Microscopical Section—Grant ...		8 10 0
			" Balance—		
			Bank of South Australia ...	88 13 10	
			Savings Bank	244 2 10	
					332 16 8
		£510 11 11			£510 11 11

Audited and found correct,

D. J. ADCOCK, Auditor.

October 6th, 1890.

WALTER RUTT, Treasurer.

October 1st, 1890.

PRESIDENTIAL ADDRESS

To the Royal Society of South Australia, October 7, 1890.

WEISMANN'S THEORY OF HEREDITY.

No country in the world offers biological problems of more entrancing interest than Australia, and it is often a source of regret to me that the too-exacting requirements of a teaching appointment, coupled with many duties both public and private, are an effectual hindrance to the prosecution of some original lines of research peculiarly Australian, any one of which might have been appropriately made the subject of an address to this Society. But as circumstances have rendered that impossible, I must fall back upon the humbler *rôle* of an interpreter of other men's thoughts, and therefore I purpose this evening to present to you, in terms that I trust will be comprehensible even to those who have had no special training in the subject, an exposition of some recent biological theories that are exciting a good deal of interest and discussion amongst the foremost investigators and physiologists of the day. And indeed, the interest excited has not been confined to the still narrow limits of the Scientific world, but it has extended to the general educated public.

The problems of heredity on which I intend to speak are not new. They were under discussion as far back as the time of Aristotle, but in our own days they have assumed a special prominence and importance not only from their fundamental relation to the Darwinian theory of evolution, but also from their association with the question of the transmission of disease and deformity, on which subject at last some light is beginning to be shed.

I must, however, disclaim any intention of laying before you all the various theories that have been offered of late years in explanation of the facts of heredity; my aim is rather to set before you without argument or comment the salient points of an elaborate and luminous theory that has recently been put forward by a distinguished German physiologist and philosopher, whose views, in spite of many objections, have met with a very general and favourable acceptance by biologists. And, whether or not they receive entire concurrence, there can be little doubt but that the theory of Professor Weismann, by reason of its extended scope and logical completeness, serves as the best working hypothesis yet extant for future investigations on the subject.

One may say this, and at the same time freely acknowledge that, in some respects, the views of Weismann have been distinctly foreshadowed or overlapped by the statements of other biologists. No one, however, has offered a theory so compact or so logically complete in all its parts.

A fresh interest in Weismann's theories, now some few years old, has been recently kindled by the publication of an English translation of his writings by the Clarendon press; but as his elaborate system of biological philosophy is there presented in a series of disconnected essays, it is a matter of considerable difficulty, for those unfamiliar with biological methods of reasoning and research, to gather up the thread of his argument which runs through the whole series of separate articles. This being so, I conceive that I may be of some service in offering to this Society an epitome of the chief theories which comprise his system, in such a form as to make its comprehension as easy as is possible in a subject naturally full of difficulties. And I will take this opportunity of acknowledging the great assistance I have received in this task from the writings of Romanes, Shipley, Sir William Turner, McKendrick, Vines, and others who have appeared either as the advocates, opponents or interpreters of the views of Professor Weismann. From these I have freely borrowed.

Recent researches, especially amongst the Invertebrata, have made it abundantly clear that the young animal arises by the fusion, within the egg- or germ-cell, of an extremely minute particle derived from the sperm-cell produced by the male-parent with an almost equally minute particle derived from the germ-cell itself the product of the female-parent. These particles are termed the male- and female-pronucleus respectively, and the resulting body formed by their fusion the segmentation-nucleus, which, though exceedingly minute, is also exceedingly complex both in its chemical and molecular constitution.

From this segmentation-nucleus and from the surrounding protoplasm of the egg-cell other cells arise by a process of subdivision, and these at length become arranged in definite layers, called the germinal layers, from which all the tissues and organs of the body are gradually formed in orderly sequence. It is the segmentation-nucleus which thus forms the starting point of all the subsequent complicated changes; and inasmuch as this is formed by the fusion of particles of material from both parents we start with the fact of a physical continuity between parent and offspring, and are thus enabled to lay down are fundamental proposition that a physical basis for heredity exists.

One result of this physical continuity of substance is that the offspring resembles the parents not only in bodily form and

feature, but also in mind and temperament, and in that *damnosa hæreditas* liability to particular diseases.

So far we are dealing with facts with which every physiologist is familiar.

Now, the size of the segmentation-nucleus, which we have seen is formed by the fusion of particles from both parents, is itself exceedingly minute, and further, in the course of division of the egg-cell the substance of this segmentation-nucleus must in the course of its diffusion amongst the continuously-increasing cells of the growing embryonic body, undergo a degree of attenuation far surpassing the extremest idea of homœopathic dilution; yet the presence of these attenuated particles is sufficient to stamp the offspring with the characters, not only of the immediate parents, but also with those of still remoter ancestors.

It is to be noted also that the power of production of a new individual lies in the special cells called germ- and sperm-cells respectively, which are, so to speak, isolated from the rest of the body and set apart for this special purpose of reproduction. Even at a very early period of growth they are thus marked off from the rest of the embryonic body, taking no part in its growth, but being only dependent on the constituent cells of this for shelter and nutrition. These special cells constitute the essential portions of what are called the reproductive organs.

The central problem of heredity is therefore the discovery of the manner in which these reproductive cells, marked off as they are from the rest of the body, become stamped, as it were, with the potentiality of transmitting to the offspring the multifarious characteristics and peculiarities, not only of the parent organisms but also to a lesser degree those of preceding ancestors; or as Weismann himself puts the question—"How is it that a single cell can reproduce the *tout ensemble* of the parent with the faithfulness of a portrait?" He proceeds to offer for the solution of this extremely difficult problem his theory of the "Continuity of the Germ-plasm," which, according to his views, rests upon the fact that the reproductive cells are not derived from the general body-cells of the individual in which they occur, but are the direct descendants of the germ-cells of the parent. In other words Weismann represents that the particulate body formed from the fusion of elements from both parents contains a substance which he calls germ-plasm, and this, he states, is not entirely used up in the formation of a given offspring, but a portion is set aside, it may be at an exceedingly early stage of development, and reserved unchanged to form the germ-cells of the next generation. The sharpest distinction is thus to be drawn between two classes of cells composing the body of the developing germ which are destined for entirely different purposes. One set is destined for the

growth of the personal structure of the body, which he terms *somatic* cells; the other for the ultimate perpetuation of the species or *blastogenic* cells which pass on as it were from generation to generation.

Further, it has been shown by previous writers that the above-mentioned particulate body or pronucleus arising out of the fusion of elements from both parents, is really formed by the conjugation of the nuclei, or more accurately, of certain parts of the nuclei, of the respective reproductive cells male and female. So it must be that it is the nuclear substance which is the real bearer of hereditary tendencies and much has been written lately as to the intricate structure of the nuclei of active cells. The two nuclei must be supposed not only to carry over germ-plasm from each immediate parent, but also some fraction from every preceding parent, the amount diminishing in geometrical ratio as we proceed backwards in the ancestral line.

This is Weismann's main contention briefly stated, but in order fully to understand his train of reasoning, and to realise the full force of his conclusions, it is necessary to review some other of his facts and arguments which are so intricately bound up with his central theory of heredity as to make the comprehension of them a necessary preliminary to the consideration of the main issue.

Starting from the position that all living organisms, whether plants or animals, consist of one or more cells, we may class them in two great divisions—unicellular and multicellular. The unicellular plants and animals are termed Protophyta and Protozoa, the multicellular Metaphyta and Metazoa respectively, and it is hardly necessary to point out that it is the unicellular plants and animals which exhibit the phenomena of life in the simplest and most elementary forms. Recognising the well-known facts that the unicellular organisms reproduce themselves by fission, that is, by the division of the parent organism into two approximately equal parts, or by the closely analogous process of gemmation, in which a small bud of the parent tissue grows from the body to increase in size and to be subsequently separated into an independent individual, Professor Weismann comes to the somewhat startling conclusion, which seems to have been overlooked by other biologists, that aboriginally life is immortal, and that the conclusion, that death is *necessarily* the end of all living things, must be abandoned. For, when a simple unicellular organism, such as the Amœba, reproduces its kind, it does so by this process of fission or division into two equal parts, each half growing into a Protozoon resembling its parent, and thus the actual and identical protoplasm of the parent Amœba lives on, as it were, in the bodies of its descendants, each one of which con-

tains a fraction of the parental living substance. As this process of division has gone on from generation to generation it is clear that the protoplasm of the ancestral and primeval Amœba has lived on ever since Amœba-like organisms made their appearance. The Protozoa then, as also the Protophyta, are endowed with the potentiality of eternal life. This does not of course imply that they cannot die, or that they do not die, but merely that, if they be shielded from fatal accidents, they do not die a natural death, but live on, increasing in size up to a certain limit, and when that limit is reached dividing into two or more similar organisms. And we may go as far as to say that every Protozoon of the present day is alive with the actual life of its primeval ancestor, the body of which has thus lived on in the substance of its descendants ever since life itself made its appearance on this planet.

Metazoa and Metaphyta on the other hand do die a natural death. To the higher organisms with which we are most familiar death is undoubtedly the end of all things.

These multicellular beings have undoubtedly descended from unicellular organisms which, we have seen, are endowed with the potentiality of everlasting life, and the former must have developed the power of dying when they ceased to consist of simple cells. The question thus arises why should life, immortal in the case of the unicellular organisms, have ceased to be so in the case of the multicellular?

Weismann's answer is based upon the fact that multicellular organisms do not propagate themselves solely by such a-sexual methods as fission and gemmation, but by a sexual process in which the origin of a new individual depends upon the fusion or conjugation of certain specialised portions of two parents.

It is true that the general body-cells of multicellular organisms can reproduce themselves to a certain degree, as shown in the growth and repair of tissues and organs, or even in certain cases of whole members, but it is only a certain specialised group of these cells which can do so to that unlimited extent which is characteristic of unicellular organisms.

It is to this limitation in respect of the power of division of the somatic- or body-cells that the phenomenon of death is owing.

Thus we return to the cardinal point which is so important. I repeat it at the risk of being tedious, that the cells of the complex Metazoon can be divided into two categories, reproductive cells and body- or somatic-cells, the former inheriting from their ancestors, the Protozoa, their unlimited power of division, the latter possessing this power only to the extent of the attainment of the limit of size of the individual, and when this limit is attained the

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organism dies by reason of the impossibility of any further growth of the body.

The reproductive cells are, then, the essential factors for the continuance of the species, the somatic for the growth of the individual.

Now, it is evident, from the point of view of the species in contradistinction to that of the individual, that a change from the asexual to the sexual method of reproduction must carry with it a distinct advantage, for, it must be remembered that the individual exists for the good of the species. The advantage which death possesses for the species appears on consideration of the consequences which would ensue if these complex organisms were endowed with immortality, for in such a case all those members of a species which multiplied by sexual methods would, in the course of time, come to be composed of broken down and decrepid individuals, resulting from the inevitable disease and accidents of life, and they would consequently be less well adapted for their place in nature than younger, healthier, and less-damaged forms.

The doom of death, then, appears to have been brought about by natural selection, inasmuch as it is for the benefit of those species which propagate themselves sexually, that the individual composing them should not live longer than is necessary for the purpose of giving origin to the next generation, and fairly launching its members on their own career of struggle for existence.

Our position, therefore, stands thus at present:—Protoplasm was originally immortal, and unicellular organisms still preserve this attribute of immortality, but in the case of the multicellular organisms which propagate sexually, natural selection has reduced the term of life within the narrowest limits which are compatible with the performance of the sexual act and the subsequent rearing of the progeny up to the period at which they are capable of taking care of themselves.

The reproductive elements of their bodies alone have reserved the attribute of immortality, as the means whereby a continuous stream of life has been maintained from the time of its first appearance until now.

Why, then, should sexual reproduction, which carries with it the doom of death, have become the universal law for all the higher organisms? Looking at its universality, it must be assumed to play an all-important *rôle* in the scheme of organic life. What is the *rôle?* Briefly, according to Weismann, its object is to furnish congenital variations to the ever ready and ever active agency of natural selection, from which the most favourably endowed examples of the species may be preserved, and their

advantageous endowments passed on to the next generation. How this is brought about will appear if we remember that at each sexual union there is a mixture of two reproductive elements, and that each of these is the product of the fusion of two other reproductive elements of the preceding generation. Thus it follows that the germinal elements of no one member of the species can ever be the same as that of any other member; in fact, each such germinal element has had a different ancestral history, and each represents an admixture derived from thousands, and perhaps millions, of individuals in different lines of descent. In the union of any two of these enormously complex but always differing germinal elements we have the cause of innumerable congenital variations—the only variations which Weismann will allow are transmissible by heredity. Though we may thus make a reasonable attempt to explain the *raison d'être* of the process of sexual reproduction, the cause which led to its adoption is a problem which still awaits suggestion and solution.

So far, then, Weismann leads us to the conclusion that the dominion and influence of natural selection can only be made to extend as far back as the Protozoa, over which it is unable to exert any influence at all, for, if natural selection depends for its activity upon the occurrence of congenital variations, and if congenital variations in their turn depend upon the exercise of the exual method of reproduction, it follows that organisms which do not propagate themselves by this method cannot present congenital variations, and cannot thus come under the dominion of natural selection; in other words, while for unicellular organisms Weismann is an exclusive advocate of the views of Lamarck, whose theory, as is well known, was mainly based upon the effect and transmissibility of acquired characters, for the multicellular he is rigidly and entirely his opponent.

Inseparably bound up with the theory of the continuity of the germ plasma is the assumption of the great difference which obtains in respect of the transmissibility of characters which are congenital, and characters which are acquired; and so much importance does Weismann lay upon a sharp and clear distinction being made between these two kinds of characters, that I had best quote the words of his own essay on this part of the subject:—"It is certainly necessary to have two terms which distinguish sharply between the two chief groups of characters—the primary characters which first appear in the body itself, and the secondary ones which owe their appearance to variations in the germ, however such variations may have arisen. We have hitherto been accustomed to call the former 'acquired characters,' but we might also call them *somatogenic*, because they follow from the reaction of the *soma* under external influence, while all other

characters might be contrasted as *blastogenic*, because they include all those characters in the body which have arisen from changes in the germ. In this way we might prevent the possibility of a misunderstanding. We maintain that the *somatogenic* character cannot be transmitted, or rather that those who assert that they can be transmitted must furnish the requisite proofs.

"The *somatogenic* characters not only include the effects of mutilation, but the changes which follow from increased or diminished performance of function, and those which are directly due to nutrition and any of the other external influences which act upon the body.

"Among the *blastogenic* characters we include not only all the changes produced by natural selection operating upon variations in the germ, but all other characters which result from this latter cause."

For example, a man may either be born with some malformation of one of his fingers or he may acquire such malformation or mutilation as the result of accident or disease. Now in the former case, when the malformation is congenital, it is extremely probable that the peculiarity will be transmitted to his children, while in the case where the man has himself acquired the deformity, it is, according to Weismann, certain that there will be no such transmission.

It is quite true that both medical men and biologists have long been aware of the remarkable tendency that exists for the inheritance of congenital deformity, but it has been at the same time generally assumed that acquired characters might also be regarded as similarly hereditable, though with less certainty and to a less extent. The difference thus being considered to be one of degree merely. Weismann makes it one of kind, and states it to be a physiological impossibility that acquired characters, as defined by him, can be transmitted under any circumstances.

He declares that the evidence put forward by other biologists in favour of the opposite view, which he discusses at considerable length in one of his essays, is either unreliable or inconclusive. On this same question much discussion has recently taken place in the pages of *Nature* between some of the most distinguished biologists of the day; indeed, it still continues with unabated vigour.

We are now in a position to resume consideration of Weismann's central theory of heredity, and, recapitulating the substance of what has gone before, we have seen that the body of the multicellular organism is composed of two entirely different kinds of cells—germ-cells and somatic-cells—the former being concerned solely with reproduction and the latter with the build-

ing up of the bodily framework in which the germ-cells find lodgement.

Further, the somatic-cells, aggregated as they are into groups constituting the various tissues and organs of the body, become subject to the action of the environment, through and by which they can be modified in various ways during the life-time of the individual. Modifications resulting from such causes are the acquired, or *somatogenic* characters of Weismann, and according to his view, they can in no case influence the germ-cells and appear in the products of these as congenital or *blastogenic* characters. The germ-cells on the other hand differ *toto cælo* from the somatic, inasmuch as they are the receptacles of the imperishable germ-plasm, and have no connection with the somatic-cells save that the former are sheltered and nourished by the latter. This germ-plasm took its origin in primeval unicellular organisms, and has been handed down from these through remote ages through them and through all the generations of multicellular organisms which, in the course of evolution, succeeded the unicellular; or putting these abstract propositions more concretely, suppose a new individual to be formed by the union of the germ-plasm of two parent organisms, a portion only of this admixture is used up in the formation of the said individual, a certain residual fraction remains stored up in its reproductive cells to be, in its turn, handed over to a member of the next generation. This successive transference from generation to generation represents that continuity of germ-plasm which is the central feature of Weismann's theory. Again, we must assume that these successive fragments, which are passed on from individual to individual, grow and multiply at the expense of the somatic cells of each individual in which they find lodgement. Whilst thus however growing and multiplying the germ-plasm itself faithfully preserves the chemical and molecular qualities of that primeval fragment which the first sexual parents passed on to their first offspring. To make these statements still clearer let me borrow from Sir William Turner the following graphic mode of expressing the above facts.*

A	B	C	D.
a	*ab*	*abc*	*abcd.*

Let the capital letters, A B C D, express a series of successive generations. Suppose A to be the starting point and to represent the somatic or personal structure of an individual, then *a* may stand for the reproductive cells, or germ-plasm, which the offspring of A, viz., B, is produced.

* The idea would have been better conveyed if the small letters had been included within the capitals.

B, like A, has both a personal structure and reproductive cells, or germ-plasm, the latter of which is represented by the letters *ab*, which are intended to show that while belonging to B they have a line of continuity with A. C stands for an individual of the third generation, in which the reproductive plasm is indicated by *abc*, to express that, though within the body of C the germ-plasm is continuous with that of both *b* and *a*.

D also contains the reproductive cells *abcd*, which are continuous with the germ-plasm of the three preceding generations, and so on; or for the sake of clearness to put the matter in yet another way as suggested by Dr. Romanes, we might represent the germ-plasm by the metaphor of a yeast-plant, a single particle of which may be put into a vat of nutrient fluid; there it lives and grows upon the nutriment supplied, so that a new particle may be taken to impregnate another vat, and so on *ad infinitum*. Here the successive vats would represent successive generations of progeny. But to make the metaphor complete one would require to suppose that in each case the yeast-cell was required to begin by making its own vat of nutrient material, and that it was only the residual portion of the cell which was afterwards able to grow and multiply. But though the metaphor is thus necessarily a clumsy one it may serve to emphasise the all-important feature of Weismann's theory, viz., the almost absolute independence of the germ-plasm. For, just as the properties of the yeast-plant would be in no way affected by anything that might happen to the vat, short of its being broken up or having its malt impaired, so, according to Weismann, the properties of the germ-plasm cannot be affected by anything that may happen to its containing *soma*, short of the *soma* being destroyed or having its nutritive functions impaired.

The consideration of this theory would be manifestly incomplete without reference to its *modus operandi* in the origination of new species, and it has already been stated that it requires the assumption that congenital variations only being inheritable no variation impressed upon the organism by the action of its environment—that is, no acquired variation can be in the same way transmitted.

Such acquired variations, however advantageous to the individual, cease with the life of that individual—are intransmisable to succeeding generations, and therefore of no account phylogenetically. Congenital variations alone tell in the process of organic evolution, and, remembering the facts we have stated as to the advantage of sexual reproduction in respect of the production of congenital variations, we can see how the process of natural selection has for its base of operations the innumerable congenital

ariations that have occurred in the course of the thousands of ears during which sexual reproduction has been in vogue.

Congenital variations are, in fact, dependent on variations of he germ-plasm out of which organisms are built, and this comes o the same thing as saying that natural selection works in and hrough these variations of the germ-plasm—that is to say, hrough natural selection. For picking out the individuals that re best adapted to their own environment, it is really picking ut the most suitable and advantageous combinations of germ-lasms which, when expanded into the resulting organisms, realise he best opportunities for survival in the struggle for existence hrough which they have to pass. And, as we have already tated, a certain overplus of this germ-plasm, not being used up n the *somatic* or personal structure of a given organism, is handed ver to the keeping of an individual of the next generation, and rom this a still smaller fraction proceeds to the next, and so on, reserving all the while its own peculiar characteristics, until in he course of sexual reproduction it meets with another fragment f germ-plasm, which may still further improve its qualities, or he reverse. In the former case the fusion will result in the naturation of an organism still better equipped for the struggle or existence than either parent, and natural selection will seize pon the improvement, and cause it to be perpetuated.

Putting the matter, then, briefly, we may say that natural election is ever waiting and watching for such fresh and fortui-ous combinations of germ-plasm as will produce individuals best alculated for survival, and on the other hand that destruction ies in wait for those combinations which result in organisms less avourably endowed.

A stability on the part of germ-plasm, unchangeable and un-lterable except by the modifying influence of other germ-plasma tself equally stable, stands, then, as an essential feature of Weis-nann's theory. The germ-plasm of any organism being of the ame essential nature as when it started on its career thousands f years ago. Like the unicellular organisms, it is endowed with he property of everlasting life; it is immortal.

Such a conclusion, however, inevitably leads to the question, What was the cause of those aboriginal differences of character n the germ-plasmas of different multicellular organisms which rst gave rise to congenital variations?

Weismann answers that those differences arose out of the riginal differences in unicellular organisms which were the ances-ors of the multicellular. The former differ from the latter, as ve have seen, in that they alone can be influenced by the action heir environment and the different species of unicellular organisms rose in consequence of these differences of reaction.

The singular but logical result of this closely-reasoned train argument is that all congenital variations of multicellular org isms are really and actually the remote consequences of differen stamped upon their primeval unicellular ancestors by variati in their surrounding conditions of life.

Such is an outline of Weismann's theory as put forth in series of essays alluded to. Many objections have been, and still being, raised to some of his facts and arguments, and e the author himself has modified some of his views since they w first enunciated. Taken as a whole, these essays constitute a markable addition to the literature of evolution, and the con sions to which they lead have already exercised a profound fluence on the current of modern biological thought, and are tined, I think, to bear still further fruits.

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AUSTRIA AND GERMANY.

Berlin—Sitzungsberichte der Königlich Preussischen Akadamie der Wissenschaften zu Berlin, 1889, No. 1 to 53; 1890, No. 1 to 19.

—— Kaiser-Königlich Geologische Reichenstalt, 1889, No. 10.

—— Naturenschaftliche Wachenschrift, Band II., No. 15; Band III., No. 4.

—— Ergebnisse der Meteorologischen Beobachtungen, 1889.

—— Verhandlungen der Gesellschaft fur Erdkunde, Band XV., part 1 to 10; Band XVI., part 1 to 9; Band XVII., pt. 1 to 6.

—— Zeitschrift, ditto, ditto, 1888-89, Nos. 133, 138, 140, 142 to 144, 146, 147.

Giessen—Oberhessichen Gesellschaft fur Natur und Heilkunde-Bericht, 26, 27.

Halle—Leopoldina, Amptliches Organ der Kaiserlich Leopoldino-Carolineschen Deutchen Akadamie Naturforscher, Heft 2 to 4.

Munich — Sitzungsberichte Mathematisch-Physicalischen Class K. B. Akadamie der Wissenschaften zu Munich, 1887, Heft 3; 1888, Heft 1, 2.

—— Abhandlungen, ditto, ditto, Band XVI., part 3.

Würzburg—Physikalisch-Medicinischen Gesellschaft zu Würzburg, 1888-89.

Vienna—Verhandlungen der K. K. Geologischen Reichenstalt, 1889, No. 18; 1890, Nos. 1 to 5.

—— Vehandlungen der K. K. Zoologisch-Botanischen Gesellschaft in Wien, Band XXXIX., Th. 1, 2. Kaiserliche Akadamie der Wissenschaften in Wien. Sitzung der Mathematisch-Naturwissenschaftliche Classe, 1889, No. 19 to 24; 1890, No. 1 to 8.

BRAZIL.

Buenos Ayres—Boletin de la Academia Nacional de Ciencias en Cordoba (Republica Argentina), Tome X., part 3; Tome XI., part 3.

Rio de Janeiro—Revista do Observatione do Imp. Observator do Rio de Janeiro ; Anno IV., Nos. 7 to 12 Anno V., Nos. 1 to 5.

CHILI.

Santiago—Verhandlungen des Deutschen Wissenschaftliche Vereines, Band II., Heft 1.

CANADA ANA NOVA SCOTIA.

Halifax—Proceedings Nova Scotia Institute of Natural Science vol. VII., part 3.

Montreal—Canadian Record of Sciences, vol. III., Nos. 7, 8 vol. IV., Nos. 1 to 3.

———— Geological and Natural History Survey of Canada Contributions to Canadian Palæontology, vol. I part 2. Micro-Palæontology of Cambro-Silurian Rocks, part 3. Annual Report, vol. III., part 1, 2 (1887-88).

FRANCE.

Paris—Sociétié Entomologique de France. Bulletin, parts XVI to LVI.

GREAT BRITAIN AND IRELAND.

Belfast—Report and Proceedings of the Belfast Natural Histor and Philosophical Society, 1888-89.

Dublin—Scientific Transactions of the Royal Society, vol. IV (series II.), parts 2 to 5 ; vol. VI. (new series) parts 3 to 6.

Edinburgh—Proceedings of the Royal Society of Edinburgh, vol XV. and XVI.

———— Physical Society, vol. I.

London—Journals of the Royal Microscopical Society ; 188 parts 5, 6 ; 1890, parts 1, 2.

——— Proceedings of the Royal Society, vol. XLIV., Nos. 27 to 280.

——— Transactions of the Entomological Society, 1888-89.

——— Proceedings of the Linnean Society, 1887-88, 1888-8

——— List of Members, 1890.

Manchester—Proceedings of the Manchester Literary and Phil sophical Society, vol. II. (fourth series).

———— Report of the Field Naturalists and Archæologica Society, 1889.

INDIA.

Calcutta—Notes on Indian Insect Pests (Indian Museum), 188 vol. I., Nos. 1 to 4.

Japan.

Tokio—Calendar of the Imperial University of Japan, 1889-90.
—— Journals of the College of Sciences, Imperial University, vol. III., part 3
—— Proceedings of the Seismological Society, vol. XIII.

Mexico.

Mexico—Memoirs de la Sociadad Cientifica; J. II., No. 2; J. III., Nos. 9, 10.

New South Wales.

Sydney—Proceedings of the Linnean Society, N.S.W.; second series, vol. IV., part 3; vol. V., parts 1, 2.
—— Journals and Proceedings of the Royal Society, N.S.W., vol. XXIII., parts 1, 2.
—— Australian Museum—Technological Report, 1889; Records, vol. I., Nos. 1, 2, 3; Guide to Australian Museum, 1890.
—— Sydney Free Library Report, 1889-90. Catalogue Scientific Books, part 1.
—— Agricultural Gazette, vol. I., part 1, 2.
—— Australian Association for the Advancement of Science —Proceedings, 1889; President's Report (H. C. Russell, B.A.), 1889.
—— Department of Mines—Recent Geological Surveys; vol. I., parts 1, 2; vol. II., part 1; Annual Reports, 1888 and 1889; Mineral products of New South Wales; Palæontology, Nos. 1, 3, 4, 5.

New Zealand.

Transactions and Proceedings of the New Zealand Institute, 1889, vol. XXII.
Colonial Museum and Geological Survey of New Zealand; Reports of Geological Explorations, 1888-89; Catalogue of of the Library; Annual Report (twenty-fourth) of the Laboratory.

Norway and Sweden.

Bergen—Museums Aarsberecht, 1888.
Christiania—Forhandlinger ved de Skandinavisha Naturforsheres.
———— Geodatische Arbeiten, Heft VI., VII.
———— Jahrbuch der Norwegischen Meteorolischen Instituts, 1887.
———— Den Norske-Nordhavs Expedition, XIX.; Zoologie-Actinida, ved D. C. Danielssen.
Stockholm—Geologistra Föreningens, Band XII., Heft 1, No. 127; Heft 2, No. 128.

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QUEENSLAND.

Brisbane—Proceedings of the Royal Society of Queensland, 1889, vol. V., part 5.
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——— Meteorological Reports and Charts, by Clement L. Wragge, F.A.S., Government Astronomer.
——— Report on the Flora and Fauna of the Bellenden-Ker Range.

RUSSIA.

Kiew—Proceedings of the Society of Naturalists, vol. X., parts 1, 2.

SOUTH AUSTRALIA.

Adelaide—Annual Progress Report Woods and Forests Department, 1888-89 (J. E. Brown, F.L.S., Conservator of Forests).
——— Meteorological Observations Adelaide Observatory, 1889 (Charles Todd, C.M.G., F.R.S., Government Astronomer).
——— Report of the Botanic Gardens, 1889 (R. Schomburgk, Ph.D., Curator).
——— Report of the Board of Governors Public Library, 1888-89.
——— Annual Report of the School of Mines, 1889.

STRAITS SETTLEMENTS.

Perak—Government Gazette, vol. III., part 1.

SWITZERLAND.

Geneva—Compte Rendu des Séances de la Société de Physique et d'Histoire Naturelle de Généve; vol. III., 1886; vol. IV., 1887; vol. VI., 1889.
Lausanne—Bulletin de la Société Vandois des Sciences Naturelles, vol. XXV., No. 100.

TASMANIA.

Hobart—Parliamentary Papers. Proceedings of the Royal Society of Tasmania, 1889; President's Address, 1889.

UNITED STATES OF AMERICA.

Baltimore—American Chemical Journal, vol. II., parts 1 to 7.
——— John Hopkins University Studies, seventh series, Nos. 2 to 12.
——— Ditto, ditto, Circulars, vol. VIII., Nos. 69 to 75; vol. IX., No. 77. Annual Report (fourteenth), 1889.

Boston—Memoirs of the Boston Society of Natural History, vol XXIV., parts 1, 2.
——— Proceedings of the American Academy of Sciences, vol. XV., part 2.
San Francisco—Bulletin of the Californian Academy of Sciences, vol. I., parts 1, 2.
——————— Memoirs ditto, ditto, vol. II., part 2.
——————— State Mineralogist's Ninth Annual Report, 1890.
——————— Californian State Mining Bureau Eighth Annual Report.
Cambridge—Bulletin of the Museum of Comparative Zoology at Harvard College, vol. XVI., Nos. 6 to 9; vol. XVII., Nos. 4 to 6; vol. XIX., Nos. 1 to 4; vol. XX., No. 1. Annual Report of the Curator of the Museum.
New York—Transactions of the New York Academy of Sciences, vol. VIII., Nos. 1 to 8.
——————— Annals ditto, ditto, vol. IV., Nos. 10 to 12.
——————— Library Journal, vol. XIV., No. 12.
Minesota—Geological and Natural History Survey, Sixteenth Annual Report.
Philadeiphia—Proceedings of the Academy of Natural Sciences of Philadelphia, 1889, parts 1, 2.
——————— Transactions of the Wagner Free Institute, vol. II.
Salem—Essex Institute Bulletin, vol. XX., Nos. 1 to 12; vol. XXI., Nos. 1 to 6.
Trenton—Journal Trenton Natural History Society, vol. II., part 1.
Washington—Publications Smithsonian Institute: Annual Report, 1886; Reports of Professor J. Henry, 1886, 1 to 10; Annual Report of the Bureau of Ethnology, 1883-84, 1884-85.
——————— Academy of Sciences, vol. IV., part 1.
——————— United States Geological Survey: Bulletins, 49 to 53; Monographs and Annual Report, 1885-86.
——————— United States Department of Agriculture: Bulletin, No. 1; North American Fauna, Nos. 1, 2.
——————— Bulletin United States National Museum, Nos. 33 to 37.
——————— Proceedings ditto ditto, vol. X., No. 87; vol. XI., No. 88.

VICTORIA.

Melbourne—Victorian Naturalist, vol. VI., parts 6 to 11, vol. VII., Nos. 1 to 5.
——————— Field Naturalists' Club Annual Report (nineteenth).

Melbourne—Transactions of the Geological Society of Australia, vol. I., part 4.
——— Ballarat School of Mines Annual Report, 1889.
——— Proceedings of the Royal Society of Victoria (new series), vol. I., part 2, 1889; vol. II.

WESTERN AUSTRALIA.

Perth—Blue Book, 1889.
——— Government Geologist: Annual Report by H. P. Woodward, F.G.S.

MONOGRAPHS AND BOOKS.

Presented by the respective Societies, Museums, and Governments.

Australian Museum—Catalogue of Australian Birds, part 2, and Supplements.
Brown, H. P.—On the Electrical Distribution of Light, Heat, and Power (New York).
Brown, H. Y. L.—Record of Mines of South Australia, 1890.
——————— Geological Map of the Tertiary Deposits at Barossa.
Buxton, Sylvester—Old New World (Salem, U.S.A.)
Bailey, F. M.—Catalogue of Plants (Brisbane).
——————— Synopsis Queensland Flora (Brisbane, 1890).
British Museum—British Museum Guide Books, 13 vols.
Bauernfeind, Carl M. V.—Bayerische Præcisions-Nivellenunt (Munich).
Darapskey, De L.—Las Aquas Minerales de Chili (Valparaiso).
Department of Mines, N.S.W.—Geology of the Vegetable Creek Tin Mining Fields.
Etheridge, Robert—The Invertebrate Fauna of the Hawkesbury Series (Palæontology Department of Mines, N.S.W.).
Ettinghausen, Dr.—Contributions to the Tertiary Flora of Australia (Department of Mines, N.S.W.).
Feistmantel, Dr. O.—Geological and Palæontological Relations of the Coal and Plant-bearing Beds of Palæozoic and Mesozoic Age of Eastern Australia and Tasmania (Department of Mines, N.S.W.).
Hayter, H. H., C.M.G.—Victorian Year-book, parts 1, 2, 1888-89.
Holmes, W. H.—Textile Fabrics of Ancient Peru (Smithsonian Institution).
Lendenfeld, Robert V. — Monograph Australian Sponges (London).

*Nowell, Cradock—Monetary Powers (Tasmania, 1890).
McCay, F.—Prodromus Zoology, Victoria, Decades XIX. and XX.
*Mueller, Baron F. von—Second Systematic Census of Australian Plants, part 1—Vasculares.
Parker, T. J.—Studies in Biology, No. 4—Skeleton of New Zealand Crayfishes.
Pilling, J. C.—Bibliography Muskhogean Languages (Smithsonian Institution).
———— Bibliography Troquoian Languages (Smithsonian Institution).
Russell, H. C.—Results of Meteorological Observations in the Shade in New South Wales, 1887 and 1888.
———— Rain, River, and Evaporation Observations made in New South Wales, 1889.
———— Astronomical and Meteorological Workers in New South Wales, 1778 to 1860.
———— Proposed Method of Recording Variations in the direction of the Vertical.
Shanghai—Catalogue Chinese Imperial Collection United States International Exhibition, 1876.
Shirley, John—Lichen Flora (Brisbane)
Thomas, Cyrus—Earthworks of Ohio (Smithsonian Institution).
———— Problems of Ohio Mounds (Smithsonian Institution).
Thurston, E.—Catalogue Batrachia, Salientia, and Apoda (Madras, 1888).
———— Notes on the Pearl and Chank Fisheries, Gulf of Manaar (Madras, 1888).
Tepper, J. G. O.—List of Named Insects South Australian Museum.
Woodward, A. S.—Fossil Fishes of the Hawkesbury Series at Gosford (Department of Mines, N.S.W.).

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30th September, 1890.

S. L. MOODY,
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Hodgson, Mrs.	Port Victor ...	1884

APPENDIX.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT.

THE Committee have pleasure in presenting the following report of the work of the Section for the year ending 30th September, 1890, which completes the seventh year of its existence.

Evening Meetings.—During the year eight evening meetings have been held, at which the attendance has on the whole been well maintained. A new departure was made at the commencement of the session, when it was attempted to make these gatherings less formal in character and partake more of the nature of "gossip" meetings. Two short papers have usually been provided for each meeting, and special efforts have been made to secure exhibits. In the latter direction the help of some of our local correspondents has been very useful. As a result of these steps the evening meetings have been more than usually interesting, and the attendance has in most cases shown an improvement on that of recent years. Papers have been contributed by the following gentlemen:—Professor W. H. Bragg, M.A.; Dr. R. H. Perks, M.A., F.R.C.S.; Messrs. T. A. Masey, F.Z.S., J. G. O. Tepper, F.L.S., W. Howchin, F.G.S., and S. Dixon.

Excursions.—There have been ten excursions during the year, at which the attendance has on the whole been satisfactory, reaching as high as over 50. In those cases where the number

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has been small the unfavorable weather has generally accounted for it. Amongst the most successful excursions have been those to the Agricultural College at Roseworthy, to Marion, and to the Smelting and Refining Works at Dry Creek. There has also been, as is customary, one sea trip for trawling and dredging. Some localities have been visited for the first time, the scrub between Gawler and Roseworthy being the most noteworthy, as it contained many plants not previously met with on these excursions.

Annual Conversazione.—The first conversazione held in conjunction with the Microscopical Section took place in October last. Notwithstanding the inclement weather it was largely attended, and proved very successful. There was a most interesting collection of objects of natural history as well as of microscopes, and Mr. T. A. Masey, F.Z.S., read a paper on "Aquaria." It is hoped that a joint conversazione of the two sections will be held annually, as a more interesting display can be made by thus amalgamating their forces.

Protection of our Native Fauna and Flora.—A separate report from the Committee appointed for this purpose is presented, from which you will learn that their efforts are being continued with encouraging results. The setting apart of Government Farm as a national reserve, which was one of the chief objects aimed at in appointing this Committee, now seems to have a fair prospect of realization. Your Committee think that there is still room for an extension of these efforts to secure national reserves.

Local Correspondents.—Although some of the persons who undertook to act in this capacity have not shown much practical interest in the work, there are others to whom the Section is indebted in various ways, chiefly for sending natural history specimens. It is intended that those persons who have thus given proof of their desire to help us shall be entered on our list as "Corresponding Members."

Membership.—There have not been so many additions to our roll of membership as last year, but the numerical strength remains about the same, as there have been fewer removals. During the year six persons have joined the Section and ten names have been struck off. The number now on the roll is 108.

SAML. DIXON, Chairman.
W. H. SELWAY, JUN., Hon. Sec.

Adelaide, 15th September, 1890.

SECOND ANNUAL PROGRESS REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE.

In presenting their second annual progress Report, the Committee appointed by the Section to seek to secure better protection for the native fauna and flora, have to state that although the progress made during the year has been slow, it has still been to some degree at least certain.

National Parks.—The Public Service Commission in their most recent report recommended that the whole of Government Farm should be set aside as a National Park. The Cockburn Government subsequently agreed to take steps to have this suggestion carried into effect; but their retirement from office prevented them from fulfilling their promise. Lately a large deputation from the City Corporation and other municipal bodies and District Councils within a radius of 20 miles of Adelaide, as well as the Royal Society and this Section, interviewed the present Premier (Hon. T. Playford) on the subject, and he appeared willing to set aside 1,700 acres of the Farm as a public park, reserving 300 acres for working men's blocks. It will be remembered that in October, 1888, Mr. Playford promised to set apart the whole of Government Farm if such were the public wish. The Committee believe that there is a considerable probability of all the 2,000 acres being eventually gained for the object specified. A report has been prepared by the Surveyor-General, which contains suggestions that 540 acres of the Farm, 3,250 acres in the Hundred of Noarlunga (adjoining the River Onkaparinga), and 1,200 acres in the vicinity of Mount Crawford should be set apart for the preservation of indigenous plants and animals. The Committee consider that, for the present, it will be expedient to continue their efforts in order to secure the whole of Government Farm.

Forest Reserves.—The Committee have noticed with the greatest regret that an extremely short-sighted policy has caused a considerable diminution of the forest areas without any compensating extension. They will continue their endeavours to have this condition of affairs remedied, and amongst other things they intend to try to secure the reservation of about 11,000 acres at Mount Crawford as a natural red-gum forest. As a means of gaining the better protection of the native fauna, the Australasian Association will be asked to urge the different colonial Governments to declare all State forests close preserves for harmless animals.

Action in the Other Colonies.—The statesman-like policy pursued

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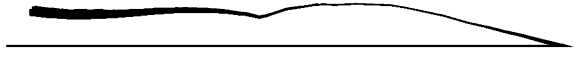

Receipts and Expenditure for the Year Ending 30th September, 1890.

Dr. Receipts.	£	s.	d.	Expenditure.	£	s.	d.
To Balance brought forward	3	5	2	By Postages	6	10	10
" Grant from Royal Society	25	0	0	" Printing (General)	6	3	0
" Subscriptions	20	0	0	" Printing (Proceedings)	5	13	6
" Microscopical Section's Share of Expenses of Combined Annual Conversazione	0	16	0	" Advertising	3	14	0
				" Attendance (Caretaker)	1	1	0
				" Sundries	0	17	0
					23	19	4
				" Subscriptions, as per contra, handed over to Hon. Sec. Royal Society	20	0	0
					43	19	4
				" Balance in Hand	5	1	10
	£49	1	2		£49	1	2

Audited and found correct,

J. H. C. LANGDON, THOS. EVANS, } Auditors.

Adelaide, 15th September, 1890.

W. H. SELWAY, Jun., Hon. Sec.

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MICROSCOPICAL SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT, 1889-90.

The Committee beg to submit the following report on the work of the Section during the last twelve months:—The attendance at the meetings has not been as good as during the previous year, but still we feel that there is no falling off in the interest taken by those who are generally to be found present at the monthly meetings. We have been deprived for most of the session of the presence and help of two of our most energetic officers. Our Chairman has been absent on a visit to Europe, and one of our Vice-Chairmen has been unable to attend through illness. Though deprived of their valuable assistance, we have been able to provide something special for each meeting of the Section, although our numbers being small the work falls rather heavily on a few. During the year we have received a further donation of books from Mr. H. C. Mais, consisting of 12 bound volumes of *Science Gossip*, from 1878 to 1889. Also from Mr. O. Boettger a number of splendid photo-micrographs of various test diatoms taken with Zeiss' apochromatic objectives. Several excursions have been made, but no new places of interest to microscopists have been found.

The number of members at present is 33, the same number as in last report, 4 members having resigned and 4 new members joined during the year. We have also 4 honorary members. The average attendance at the monthly meetings has been a little over 8, exclusive of visitors.

The subjects discussed at the meetings were as follows:—

Nov. 13. Paper on "Double-Staining Wood Sections," by the
1890. Chairman—Mr. W. B. Poole.

Mar. 11. Paper on the "Development of Fresh-water Polyzoa," by the Chairman—Mr. W. B. Poole.

April 8. Gossip meeting.

May 13. Paper on the "Amphipoda," by Mr. E. J. Bradley.

). Paper on "Collecting Marine Objects with the Tow-net," by Mr. W. H. Baker.
3. Demonstration on obtaining oblique light with high powers without use of condenser or mirror, by Dr. T. Whittell.
2. Paper on "Preparing and Mounting Teeth," by Mr. S. L. Moody.

ne 15th October a joint conversazione was held with the Naturalists' Section, and was fairly attended, considering avourable weather.

ollowing excursions were made:—
). Henley Beach.
. Trawling expedition with Field Naturalists' Section.
). Blackwood.

alance-sheet shows a balance in hand of £4 8s. 7d.

D. Fleming, Acting-Chairman.
J. W. Russell, Secretary.

mber 30, 1890.

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MICROSCOPICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

RECEIPTS AND EXPENDITURE FOR YEAR ENDING 30TH SEPTEMBER, 1890.

1889.	RECEIPTS.	£	s.	d.
Sep. 30.	Balance in Hand	8	3	5
1890.				
Sep. 30.	Subscriptions Received	8	5	0
	Royal Society	8	5	0
		£24	13	5

PAYMENTS.	£	s.
Magazines	1	15
Binding Magazines	2	0
Stationery	1	4
Printing Proceedings	2	3
Post Cards and Printing same	0	16
Covers for Magazines	0	10
Postages, &c.	1	6
Attendance	1	9
Expenses of Joint Soiree	0	16
Royal Society	8	5
	£20	4
Balance in Hand	4	8
	£24	13

Audited and found correct,

S. L. MOODY,
W. H. BAKER, } Auditors.

30th September, 1890.

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TRANSACTIONS

OF THE

AL SOCIETY of SOUTH AUSTRALIA.

VOL. XIV., Part I.

EDITED BY PROFESSOR RALPH TATE.

ISSUED JULY, 1891.

Adelaide:

W. C. RIGBY, 74, KING WILLIAM STREET.

s for transmission to the Royal Society of South lia, from Europe and America, should be addressed W. C. Rigby, care Messrs. Thos. Meadows & Co., 35, Milk Street, Cheapside, London."

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RAMMAR AND VOCABULARY OF THE LANGUAGE POKEN BY THE ABORIGINES OF THE MACDONELL RANGES, SOUTH AUSTRALIA.

he Rev. H. KEMPE, of the Mission Station, River Finke, Corr. Memb.

[Read December 2, 1890.]

PREFACE.

e result of an attempt to analyse a language of which the e speaking it have only a colloquial knowledge, and who are quently incapable of answering or even understanding gram- al questions, must be in many respects imperfect. The lty is increased by the wandering habits of the people, g it impossible to maintain that constant communication hem which is necessary for the attainment of a complete ledge of the structure of their language. It is only with elp of the boys grown up on the station, and who have e less nomadic than their elders, that the knowledge ained has been established. There still remain mysterious es, incapable as yet of being traced back to their origin, ng solution. The following pages, therefore, do not profess tain a complete vocabulary, nor one which would satisfy rned philologist. Even up to the present day expressions p for things it was thought the natives had no words. The lty is increased by the close proximity of another tribe, for of the Finke the natives speak a different language alto- , as their words terminate in *i* and *u* and *au*, whilst the terminate all in *a*. As they have frequent intercourse ach other, it is very easy to understand that the natives to *-th* must have adopted many of the words and phrases of o the south.

cerning the vocabulary, it may be mentioned that it has arefully compiled and revised several times with different , so that the words may be relied upon as correct.

e pages are submitted in the hope that they will prove ing to the philologist, as exhibiting the peculiar structure language spoken by a people generally considered among est in the scale of mankind, and will contribute a little perpetuating the knowledge of a language of one of the ian tribes of natives before their probable entire extinc- a no very remote period.

vocabulary is that of the tribe inhabiting the River Finke,

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and is also, with only slight variations in the dialect, that of the tribes in the MacDonnell Ranges eastward to Alice Springs, but not far westward of the River Finke, and extending southward to the Peake.

GRAMMAR.

CHAPTER I.

Of the Characters taken to Represent the Sounds of the Language, and their Pronunciation.

VOWELS.

A a, like a in father, are
E e, like e in there, were
I i, like i in tin
O o, like o in more
U u, like u in dull, or o in more.

DIPHTHONGS.

Ai ai, like i in light
Au au, like ow in now
Oi oi, like oi in oil.

CONSONANTS.

B b, like b in be
D d, like d in do
G g, like g in go
H h, like h in here
J j, like y in year
K k, like k in king
L l, like l in long
M m, like m in more
N n, like n in near
Ng ng, like ng in ring
P p, like p in pipe
R r, like r in roam
T t, like t in to
Tj tj, like g in gentle
W w, like w in wife

These are the primitive sounds, to which for the sake of the pronunciation of the Scriptural names, were added—

F f, like f in far
S s, like s in so
Z z, like z in zero.

The vowels and diphthongs are to be considered as always short. In order to make the number of written characters as few as possible, the elongation of the syllable is indicated by a small stroke over the letter, as, lāda, "the paint," in which the a is to be pronounced long, as in far.

When two or three vowels occur, they form a dipthong; if not, they are separated by the mark of diœresis (¨), as, leoïka.

CHAPTER II.

Of Substantives and their Cases, and of Prepositions.

Substantives have three numbers: singular, dual, and plural, but no distinctive mark for gender either by the use of an article or otherwise. There is no article

All words terminate in *a*, with the exception of the vocative of substantives, and the imperative mood of verbs which terminate in *ai*.

The dual is formed by adding the termination *ntatera* to the word, as, *atua*, "the man," *atuantatera*, "the two men."

Besides this there is a particular form of dual, which is only used personally by annexing the particle *nanga*, as, *wora*, "the boy; *worananga*, "the two boys;" *kwara*, "the girl;" *kwarananga*, "the two girls."

The plural is formed by adding *irbera* or *antirbera*, as, *aragutja*, "the woman," *aragutjirbera* or *aragutjantirbera*, "the women."

This form cannot be used in the neuter gender, but the form *ntatera* can also be used personally.

There are six cases—nominative, genitive, dative, accusative, ablative, and vocative.

a. The nominative is expressed in a double manner. The word is unchanged, if connected with an intransitive verb, as, *atua indama*, "the man sleeps," or *katjia lima*, "the child goes;" but it is formed by adding the particle "*la*," when it is unconnected with a transitive verb, as, *worala gama*, "the boy cuts," &c., or *apmala utnuma*," &c., "the snake bites," &c.

b. The genitive is formed by adding *ka*, as *kataka*, "of the father." By the genitive is expressed either possession, as, *wora kataka*, "the son *of the* father;" or it shows to whose advantage or disadvantage anything is done, as, *ta irbunga inaka kniribata ka*, "I fishes caught old man for," *i.e.*, "I caught fishes *for* the old man." It also expresses the purpose of any action, as, *aragutja inkuka laka*, "the woman went *for* bullrushes," *i.e.*, to fetch bullrushes.

c. The dative terminates in *na*, as, *ata katjiana ntema*, "I give *to the child.*"

d. The accusative is always unaltered, as, *ta kwatja njuma*, "I drink *water.*"

e. The ablative terminates in "*nga*," and shows the direction whence a thing comes, as *ta kwatja nanjinga inama*, "I fetch water *from the well*;" or it signifies the material from which a thing is made, as *era ulbaïnja ititjinga erbuma*, "he a boomerang of mulga makes;" or it signifies the cause for which a thing is done, as *jinga woringa tarama*, "I laugh *for the sake of the boy.*"

f. The vocative terminates in *ai*, as, *katjiai*, "child!"

The declension of the substantive may be seen by the following table:—

Singular.

Nom.	atua, or atula, the man.
Gen.	atuka, of the man.
Dat.	atuana, to the man.
Accus.	atua, the man.
Abl.	atuanga, from, for the man.
Voc.	atuai! man!

Dual (Personal).

Nom.	atuananga, the two men.
Gen.	atuanangaka, of the two men.
Dat.	atuanangana, to the two men.
Accus.	atuananga, the two men.
Abl.	atuananganga, from the two men.
Voc.	atuanangai! you two men!

Dual (Neuter).

Nom.	lunjantatera, the two huts.
Gen.	lunjantateraka, of the two huts.
Dat.	lunjantaterana, to the two huts.
Accus.	lunjantatera, the two huts.
Abl.	lunjantateranga, from the two huts.

Plural.

Nom.	atuirbera or antuantirbera, the men.
Gen.	atuirberaka or antuantirberaka, of the men.
Dat.	atuirberana or antuantirberana, to the men.
Accus.	atuirbera or antuantirbera, the men.
Abl.	atuirberanga or antuantirberanga, from the men.

Other substantives are formed—

(a.) by adding to primitive substantives the particle "*ringa*," signifying something pertaining or belonging to a certain thing or place, as, *arila*, "sand;" *arilaringa*, "a man belonging to or being at home in a sandy country;" or *aputa*, "hills or ranges;" *aputaringa*, "men whose home is in the ranges." This particle is also affixed to names of places, and expresses the place at which one is at home, as *mbarata*, "a place;" *mbarataringa*, "men who are at home at *mbarata*."

(b.) Out of the roots of verbs, as, *gama*, "to cut;" *ganangana*, "a cutting thing, *i.e.*, a knife;" *indama*, "to sleep;" *indanindana*, "a sleeping thing, *i.e.*, a bed;" *tuma*, "to beat;" *tunatuna*, "a man beating, *i.e.*, a beater;" *ntema*, "to give;" *ntenantena*, "a giving man, *i.e.*, a giver."

OF PREPOSITIONS.

There are two classes of prepositions, one class consisting of separate words and the other consisting only of small particles, annexed to the substantives, to which they belong as suffixed. As the prepositions, consisting of separate words, are placed at the end of the word to which they belong, they should be rather called *postpositions*. The majority always govern a certain case.

a. Those taking the ablative case are nine in number, viz.:—

1. *ulara*, "in front," as,

era atunga ulara tnama.

"he of man in front stands."

also governs the genitive case when used in the sense of
st" either friendly or hostile, as,
era tjinakatjina nukanaka ularа nama,
"he friendly me against is,"
i.e., "He is friendly towards me."
pala, "behind," as,
era woranga topala nama,
"he boy behind is,
i.e., "He is behind the boy."
atala, "outside," as,
katjia iltanga gatala nama,
"child from house outside is,"
i.e., "He is outside the house."
bobula, "between," as,
kwara worateranga mbobula tnama,
"girl boys two between stands,"
i.e., "the girl stands between two boys."
tuara, "other side" (Latin, *trans*), as,
erila ulbaïinga ntuara lima,
"man river otherside goes,"
i.e., "the man goes on the other side of the river."
unkara, "this side" (Latin, *citra*), as,
ilta nuka ulbaïinga nunkara tnama,
"house my river this side stands."
i.e., "my house stands on this side of the river."
nkelala, "beside" (Latin, *juxta*), as,
era nkelala katunga nama,
"he besides father sits."
i.e., "he sits besides the father."
itinjawara, "close by," as,
iltanga itinjawara,
"from house close by."
i.e., "close by the house."
tuarintjirka, "through," as,
nana ta altjuranga ntuarintjirka iwuma,
"this I hole through throw."
i.e., "I throw this through the hole."

ose with accusative case are four in number, viz. :—
tningala, "upon," as,
jinga aputala katningala tnama,
"I hill upon stand."
atningalagana, "over," as,
ngapa bira katningalagana ilbanama,
"crow tree over flies."
i.e., "the crow flies over the tree."

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III. *kwanakala*, "down," as,

jinga apmta kwanakala lulıma,
"I hill down climb."
i.e., "I climb down the hill."

IV. *kwanala*, "inside," as,

katjia iltakwanala nama,
"child house inside is."

c. Prepositions annexed to nouns as suffixes are nine, viz. :—

I. *una*, "on, upon, into," as, *kwatjuna*, "to the water;" *birına*, "upon the tree;" *nanjuna*, "into the well."

II. *lela*, signifies the instrument with which or the person by whom anything is made or accompanied, as, *ilupalela*, "with the axe;" *erilalela*, "by the man;" *jinga erinalela lama*, "I go with him."

III. *la*, signifies the place where anyone is, as, *aputala*, "on the hill;" it is therefore annexed to all names of places, as, *tjoritjala*, "at Alice Springs;" *tungala*, "at Henbury."

IV. *gata*, "with" (Latin, *cum*), as,

atua tjatagata bitjima,
"the man spear with comes."

V. *raba*, "without," as,

era gararaba albuma,
"he meat without goes back."
i.e., "he goes back without meat"

VI. *gitjala*, "for, in exchange," as,

ta mana ntitjinanga irbungagitjala,
"I bread will give fishes for."
i.e., "I shall give bread for fishes."

VII. *kaguia*, "for the sake of," as,

unkwangakaguia ta tarama,
"your sake for I laugh."
i.e., "I laugh for the sake of you."

VIII. *kieka*, "on, to," as,

ta ipepa iltakieka kantaturna,
"I paper house on nail."
i.e., "I nail the paper on the house."
or, *erinakieka ta kumilaka,*
"him on I have sinned."
i.e., "on him I have sinned."
or, *nilknambakieka ta ngana numerilama*
"thief to I you count."
i.e., "I count you a thief."

IX. *ibera*, *ibena*, "from, out of," as,

iltibera, "out of the house;"
kwatjibena, "from the water."

CHAPTER III.

Adjectives and their Degrees of Comparison; of Numbers.

ADJECTIVES.

ectives may receive the same particle as the noun, to which elong; the particle is generally omitted in one of the the substantive as a rule, for only the last word is de- as,

ta katjia tera marana mana ntema,
"I child two good to bread give."
i.e., "I give bread to the two good children."

des these primitive adjectives, others are formed—

rom substantives, by annexing the particle *karinga*, as, , "water;" *kwatjakaringa*, "watery;" or, *arila*, "sand;" *ringa*, "sandy;" or the particle *buta*, as, *puta*, "stone;" *ta*, "stony;" or the particle *mata*, as, *kankinja*, "love;" *jamata*, "loving;" *njirkna*, "hate;" *njirknamata*, "spite- *kata*, "father;" *katamata*, "fatherly."

rom the roots of verbs by adding the particle *ntjalkua*, as, "weep;" *tnintjalkua*, "disposed to cry;" *ankama*, ;" *ankantjalkua*, "talkative."

he degrees of comparison—

Comparative of equality:

nana tera mala knira naramanga,
"these two equal large are."

omparative of superiority is formed by adding the particle , as,

nana wora maralkura nama, nana ngetjina,
"this boy good more is, that than."
i.e., "this boy is better than that."

he superlative can only be expressed either by repetition of ord, as, *kunakuna*, "very bad;" or by adding the word, , "very," to an adjective, as, *tjenja*, "high;" *tjenjindora*, high."

Diminutives are formed by adding the particle *kotjirka* to ord, as, *putakotjirka*, "a very small stone;" *kurkakotjirka*, y small one."

NUMBERS.

re are primitively only numbers up to four, viz.:—*ninta*, " *tera*, "two;" *teramininta*, "two by one," *i.e.*, "three;" *tera*, "two by two," *i.e.*, "four."

se numbers are declined in the same way as nouns when ng in place of one.

higher numbers are expressed by:—*urbutja*, "some;"

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arinabula, or *arungalura*, "a few;" *njara*, "many;" *njaraknura*, "very much."

CHAPTER IV.

Of Pronouns.

POSSESSIVE PRONOUNS.

The possessive pronouns are the only class of pronouns whose declension is perfect (all others are more or less defective as regards declension). They must therefore be taken first as in many instances they supply the deficiencies of other pronouns. All pronouns, if declinable, are with only slight alterations declined as substantives, as the following table, giving the declensions of the possessive pronouns, shows :—

Singular.

First Person.

Nom.	katjia nuka, my child.
Gen.	katjia nukanaka, of my child.
Dat.	katjia nukana, to my child.
Accus.	katjia nuka, my child.
Abl.	katjia nukananga, from my child

Second Person.

Nom.	kwara unkwanga, thy girl.
Gen.	kwara unkwanganaka, of thy girl.
Dat.	kwara unkwangana, to thy girl.
Accus.	kwara unkwanga, thy girl.
Abl.	kwara unkwanganga, from thy girl.

Third Person.

Nom.	kata ekura, his, her, its father.
Gen.	kata ekuranaka, of his father.
Dat.	kata ekurana, to his father.
Accus.	kata ekura, his father.
Abl.	kata ekurananga, from his father.

Dual.

First Person

Nom.	maia ilinaka, the mother of us two.
Gen.	maia ilinakanaka, of the mother of us two.
Dat.	maia ilinakana, to the mother of us two.
Accus.	maia ilinaka, the mother of us two.
Abl.	maia ilinakananga, from the mother of us two.

Second Person.

Nom.	kalja mbalaka, the elder brother of you two.
Gen.	kalja mbalakanaka, of the elder brother of you two.
Dat.	kalja mbalakana, to the elder brother of you two.
Accus.	kalja mbalaka, the elder brother of you two.
Abl.	kalja mbalakanaka, from the elder brother of you two.

The third person dual, *ekuratera*, "their two," and all persons plural, as, *anunaka*, "ours;" *araganka*, "yours;" and *etnika*, heirs;" are treated exactly like those above.

Besides these there are other possessive pronouns, which have th a reflective and a reciprocal sense, acting however as possesse pronouns as well; in this case their meaning is, pertaining belonging to any person.

They are only used in the nominative case, and are undeclin-e.

nukara,	mine.
unkwangara,	thine.
ekurara,	his, hers, it.
ilinakara,	our two.
mbalakara,	your two.
ekuraratera,	their two.
anunakara,	ours.
aragankara,	yours.
etnikara,	theirs.

The following double forms have the same meanings:—*nukiltja* d *nukaringa*, "mine;" *unkwangiltja* and *unkwangaringa*, hine," &c., but these two are like the first-named, regularly clined.

Nearly all pronouns may be connected with all specified prepo-ions in Chapter II—*katjia nukanauna*, "to my child;" *katjia kalela*, "with or by my child," &c.

PERSONAL PRONOUNS.

a. First Person Singular.—There are two pronouns for "I," , *ata* or, the first *a* being dropped, *ta*. This is always used en connected with a transitive verb, as, *ta tuma*, "I beat," *ilkuma*, "I eat;" whereas connected with an intransitive rb, there is used *jinga*, as *jinga lima*, "I go," or *jinga indama*, sleep;" *ta* is indeclinable, but when, for instance, they say, God gives me life," where give is a transitive verb, they use *ga*, and say,

Altjirala jingana etata ntema.
"God to me life gives."

t supposing they say, "he died for me instead of me," this is pressed by the possessive pronoun *nuka*, as, *era nukanya iluka*, e for me died," because *jinga* is only used in the nominative d dative cases.

b. Second person, *unta*, "thou, you." This stands also only nominative case; where necessary they take for declension the ssessive pronoun *unkwanga*, "thy." This is sometimes in nitive and dative cases abbreviated, viz.,

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unkanganaka to ngaka,
unkwangana to ngana,
unkwanganga to nganga, as,
ta nana ngana ntema,
"I this you to give,"
i.e., "I give this to you."

c. The third persons singular, dual, and plural are regularly declined, like possessive pronouns. List of personal pronouns:—

ta or jinga,	I	eratera,	they two.
unta,	thou	anuna,	we.
era,	he, she, it	arankara,	you.
ilina,	we two	etna,	they.
mbala,	you two		

In connection with these is also used the suffix, *arpa*, "self," by annexing it to the personal pronouns, *ta*, *unta*, *era*, &c.,

ta arpa, contracted tarpa, I, myself,
unta arpa, contracted untarpa, thou, thyself,
era arpa, contracted erarpa, he, himself,

and the others the same. This form is also used in the sense of "not ordered," "not compelled," as,

ta erina ntankatjimakana, erarpa bitjima,
"I him called have not, he self comes,"

i.e., "I have not called him; he comes himself." Another form of emphatic sense is *utara* in singular, as,

unta kala rula tukala, tautara tuiai,
"you enough wood have cut, I shall cut,"

i.e., "you have cut wood enough; I shall cut." This is altered in dual and plural to *watera*, as, *ilinawatera*, *mbalawatera*.

Besides those above-mentioned, there are the following Reflective and Reciprocal Pronouns, viz.:—*nukara*, mine, *unkwangara*, "thy," &c.

Ex. reflective. *ta nukara tulama*,
"I myself beat."

Ex. reciprocal. *etnikara turirama*,
"they beat each other."

The only sign whether a pronoun is reflective or reciprocal is shown in the form of the verb—*vide* Chapter VIII.

There are only two Demonstrative Pronouns—

nana,	this.
nanatera,	these two.
nanirbera, nanankana	these.
tana,	that.
tanatera,	those two.
tanirbera, tanankana	those.

tead of *tana* is also used, *nakuna* and *arina*, "that."
clined in the same manner as possessive pronouns.

There are also only two Interrogative Pronouns.
nguna, "who?" and *iwuna*, "what?"
Dual and plural formed like those in the demonstrative pro-uns.

The only difference in the declension of these two is that the minations of genitive, dative, and ablative cases, dual and ral, are inserted between the root and termination of the rd, as—

Dual.

Gen. ngukatera? of which two?
Dat. ngunanatera? to which two?
Abl. ngunangatera? from which two?

Plural.

Gen. ngukirbera? / ngukankana? } of which?
Dat. ngunanirbera? / ngunanankana? } to which?
Abl. ngunangirbea? / ngunangankana? } from which?

The correct answer to the question, *ngula nana nilknalinaka?*
"who this stolen has?"
ist be, *katjiala nana nilknalinaka*,
"the child this stolen has;"
t *katjia*, because steal is a transitive verb.

The questions, *nguna unta nama?* "who are you?", *nouna na nama?* "what is that?", or *nana, iwuna, ntitja?* "this, at is it?", are answered, *jinga nama*, "I am;" and *nana*, *a ntitja*, "this, that is it."

RELATIVE AND INDEFINITE PRONOUNS.

a. There are no Relative Pronouns in the language; they e expressed either by repetition of the demonstrative pronouns, *na* and *tana*, as,

atua nala, nana tmurka albuka, worana tukala,
"man this, this yesterday went away, the boy has beaten,"
., "the man who went away yesterday has beaten the boy;"
else by the participle of verb corresponding with the English rticiple, as,

ilupa tera, iltala mbakatnarakala, jiraka,
"axes two, on house were leaning, disappeared."
., the two axes, which were leaning on the house, disappeared."
b. The Indefinite Pronouns are the following:—

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arbuna and tueda,	another.
arbunatera,	two others.
arbunirbera and arbunankana,	others.
urbutjarbuna,	some others.
nkarba,	a few others.
tuedakatueda,	others.
nintamintnta,	one by one, each.

The declension of these is regular.

There are three pairs of Correlative Pronouns, used only in the nominative case:—

ntakina?	how, or in what way?
lakina,	thus, this way.
ntakinja?	how many?
lakinja,	so many.
ntakata?	how big?
nakakata,	so big.

CHAPTER V.

Of Adverbs, of Conjunctions and Interjections.

Derived adverbs, corresponding with English adverbs in "ly," are formed by adding the particle "la" to adjectives, as *era ekaltala erguma*, "he holds fast."

Others are—

a. ADVERBS OF TIME.

lata,	now.
lilika,	soon.
tmurka,	yesterday.
tmurkarbuna,	the day before yesterday.
ingunta,	to-morrow.
imanka,	long ago.
anma,	by and by.
ilangara?	what time?
kuta,	always.

Others will be found in the vocabulary.

b. OF PLACE.

nana,	here.
itinja,	near.
longa,	far.
ntala?	where?
ntauma?	whither?
ntananga?	whence?
nauna, arinuna,	thither.
arina,	there.

c. OF NUMBER.

ninta ranga
ninta ngara } once.
ntakinjaranga? how many times?
tera ranga, twice.
urbutja ranga, sometimes.

d. OF ORDER.

arugula, the first.
mbola, between.
inkana, the last.

e. OF QUANTITY.

njara, much.
kala, enough.
kurka, a little.
lakina, so.
ngera, like.
wota, more.

f. OF QUALITY.

monjala, slowly.
kuna, badly.
parpa, quickly.
mara, good.

g. OF AFFIRMATION.

tutna, certain, true.
wakuia, of course.
wa,
wabala, } yes.

h. OF NEGATION.

itja, no, none.
gunia and lira, none.

CONJUNCTIONS.

language possesses very few conjunctions. The majority
bined with the verb. There is not even a proper word
copula, and the following are the only ones found :—

tuta,
urungara, } too, also.
etalinja, yet.
bula, but.
wara, only.
ngetjina, as, than.
gurunga, then.
nta (suffix), only.

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INTERJECTIONS.

aai !	"hear!"
apu !	"I am sorry."
erai !	"behold!"
tjikai !	"Ah!" calling attention.
tjikabai !	"woe."
nturbai !	"indeed, it is true."

CHAPTER VI.

OF TENSES, VOICES, NUMBER, AND MOODS OF VERBS.

There are three tenses. The present tense is indicated by the mination "*ma*" added to the root of the verb, as, *tuma*, beat." *Tu* is the root of the verb, but *ma* is the termination.

This also represents the Infinitive of the verb, there being other form to indicate it, so that the meaning is, "I do beat," "I beat."

The perfect tense is formed by adding the particle *ka*, or *k* to the root of the verb, as, *tuka*, or *tukala*, "I have beat The first probably corresponds to the Imperfect and the latte the Perfect, though the natives themselves cannot explain difference.

There is still another form for the perfect tense, viz., *tjita*, *tutjita*, "I have beaten," which is very likely the Prete though it is difficult to determine the difference, as they h very little notion of time, and use often for remote time b forms, *ilkukala* and *ilkutjita*, which both mean "I have eat but leaves it undecided whether yesterday or a long time ago.

The future tense is formed by adding *tjina* to the root of verb, as, *tutjina*, "I shall beat;" or, *ilkutjina*, "I shall eat."

OF VOICES.

The Active Voice signifies always an action executed b subject, but this may be:—

a. Intransitive when it signifies an action remaining with subject, as, *antata alknanbuma*, "the flower blooms;" or, *lima*, "he goes."

b. Transitive when it signifies that the action is or may transferred to an object in the accusative case, as, *ta kw njuma*, "I drink water;" or, *ta wora tukala*, "I have beaten boy."

The Middle Voice signifies an action which the subject cutes directly upon himself, as, *ta nukara tulama*, "I beat self;" *ta nukara tulaka*, "I have beaten myself;" *ta nuk tulitjina*, "I shall beat myself." As will be seen, the sig the middle voice form is inserted in the middle of the verb, sisting of the particle *la* or *li*.

reciprocal form, which, of course, can only be with dual ural, is known by the termination *rama* for dual and for plural, as, *ilina turama*, "we two beat each other;" *turirama*, "we beat each other."

roper form for the Passive Voice does not exist, and it is ed by putting the subject in active form and the object in ive case, as,

atula worana tukala,

"by the man to the boy is beaten."

i.e., "the boy is beaten by the man."

OF NUMBER.

e are, as with nouns and pronouns, three numbers, *i.e.*, r, dual, and plural. These can be distinguished by the ation of the verb, if unconnected with a pronoun. The n being used the plural form of the verb may be omitted, being necessary to a clear understanding. There is no on account of gender or persons, the latter being ex- by the pronoun. The termination of the dual of in- ive verbs is *rama*, of plural *rirama*; as, *jinga lama*, "I *lina larama*, "we two go;" *anuna larirama*, "we go." ransitive verbs the dual and plural are formed by using transitive verbs, *nama*, "to be;" and *lama*, "to go;" as ry verbs, as, *ta ilguma*, "I eat;" *ilina ilgula narama*, "we t;" *etna ilgula narirama*, or *etna ilgulta nama*, "we eat." vo expressions signify the same; but the latter is very a form of participle, so that the meaning would be "we ing." It will be seen by this that the only difference is in he participle, *la*, added to the root of the main verb.

dual and plural in the Middle voice double the particle, *ilinakara tulala narama*, "we two beat ourselves;" *kara tulala narirama*, "we beat ourselves."

OF THE MOODS OF VERBS.

e are three chief moods—Indicative, Conditional, and tive. The form of the Indicative has been given already. nditional is formed by adding the termination, "*mara*," root, as *ta ilkumara*, "I should eat."

Imperative is formed by the particle, *ai*, added to the s, *tuai!* "beat;" *ilgula narai!* "you two eat!" *ilgula i!* "eat you!"

ther form, signifying an order to do it quickly, is composed repetition of the root of the verb and the insertion of the e, "*lba*," as *tulbatuai!* "beat quickly!"

belonging to the Imperative may be reckoned the follow- m:—

ta tuiai! "let me beat!"

anuna ilkula narireai! "let us eat!"

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These chief moods, as well as the accessory ones, have almos all a double form—one for a positive and one for a negativ sense—as,

Positive.	Negative.
ta tuma, I beat.	ta tutjikana, I beat not.
ta njuka, I drunk.	ta njutjimakana, I have n drunk.
ta gatjina, I shall cut.	ta gatjigunia, I shall not cut.

The other accessory moods are—I. The Participle, meanin doing, as doing, while doing, &c., formed by the particles "*manga*," for present, "*mala*," for perfect, and "*tjinanga*," f future tense, as,

tumanga, while beating.
tumala, after beating.
tutjinanga, shall be beating.

II. The Supine is formed by the particle, *tjika*, as,

ta tutjika, to beat, or I must beat.
ta tutjika bitjima, I came to beat.
negative, ta tutjika nitjika,
I to beat must not, *i.e.*, I must not beat.

There is another similar form, difficult to designate, formed b the particle, "*mitja* or *kutja*," added to the root of verbs, a *tumitja* or *tukutja*, probably an abbreviation of *tuma* and *itj* "not," and of *tuka* and *itja*. The meaning of it is,

lai! ta ngana tumitja,
go! I you not beat!
i.e., go, that I do not beat you!

Connected with the participle perfect is another form, *tumal katana*, meaning seeming to be so, as,

Alinga airima limalakatana,
"Sun sees, going as if,"
i.e., "the sun seems as if he were going;" or,
Porpala limanga bira limalakatana,
"quickly when going, tree seem to go,"
i.e., "When quickly going, the trees seem to go."

CHAPTER VII.

Of Auxiliary Verbs.

Pure auxiliary verbs, as, to *be*, to *have*, *may*, *can*, &c., are n used as such, for the verbs in use for auxiliary verbs are n treated in the same way as in English. They act as absolut verbs as well; for example, *nama*, "to be," means also "to s down."

There are only two used as auxiliary verbs proper: *nama*, "t be;" and *lama*, "to go."

ldition to these, there is a class of verbs used for different
s, and in various manners.
› make out of intransitive verbs transitive ones, as,
ma, "to arise or awake," is intransitive, but by omitting
and instead of this adding *lilama*, *kumililama* is formed,
becomes transitive, with the meaning, "to wake or call
r again, *ntankama*, "to call," by adding the verb *lelama*,
omise," it becomes a transitive verb, meaning "to save, to
."
o form verbs from substantives and adjectives, as, *inguia*,
by adding to this *erama*, "to see," it becomes an intran-
verb, "getting or becoming old" *(inguierama)*, though
is originally a transitive verb; or to *atua*, "man," add
it becomes *atuerama*, "becoming a man;" or *tjeba*, "a
to this add *gama*, "to cut," thus, *tjebagama*, "to cut in
to tear," &c. In similar ways are also used *wuma*, "to
ilama, "to say;" *ankama*, "to speak;" *albuma*, "to go
arinama, "to put;" *ntema*, "to give;" *indama*, "to
anbuma, "to touch;" and many others.
re passing to the original or main verb, a table showing
jugation of an auxiliary verb will be given in full, as it
so frequently. The present tense is given in full, but
on only the first person of each number is taken.
Table I., Appendix.
ne same way are treated all intransitive verbs.

CHAPTER VIII.

Of Transitive Verbs and their Conjugation.

conjugation of the transitive verb is easy to comprehend,
eds only the proper pronoun to be put in its proper place.
of further explanation it will be best to give a table
the conjugation of the transitive verb *tuma*, "to beat,"
it takes all tenses, moods, and voices, whilst others are
less defective.
ill be seen by Table II., Appendix, only the first person
n given showing the conjugation of the reciprocal form.
sufficient as the others are regular.
re the negative conjunction *gunia* (meaning "no" or
) occurs, there is no particular form used; neither is there
the Participle future negative, the future of the Indica-
gative being employed—*vide* Table I., Appendix. This is
e case with the regular conjugation of the simple verb.
are, however, an almost endless number of secondary no-
nnected and combined with the verb, which it is difficult
gnate by any term. The natives combine almost everything

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with the verb, which in English are expressed by adverbs of place, of time, of quality, of quantity, &c.

These combinations make the use of the verb a sort of labyrinth, through which it is a difficult task to follow or keep the clue. The following chapters will be devoted to putting these into classes, so as to render the subject as simple as possible.

CHAPTER IX.

Verbs Combined with the form "Tula."

This form "tula" is used with the conjugation of the absolute verb in the active as well as in the middle voice, but whether as a kind of supine or not, it is always used as a main verb.

The other forms combined with this form act as auxiliary verbs, and most of them are treated as in Table I., Appendix. They are the following:—*uma* or *wuma*, "to hear;" *nama*, "to be;" *lama*, "to go;" *albuma*, to return;" *ngama*, "to carry."

Then there are several others where only the form *tula* is either altered or elongated; these cannot be considered combined verbs, although they are contracted with particles or fragments of other words.

For the sake of a more distinct arrangement both will be considered in different paragraphs.

Verbs combined with "tula."

I. *Tula nama*, "to beat for a certain time constantly," which is expressed by the auxiliary verb *nama*, "to be" or "sit down;" so that the meaning of it is "I beat constantly or continually."

This verb is conjugated in all the moods and voices of Table I., Appendix, except Middle and Reciprocal, which adopt the conjugation of the absolute verb *tuma*, "to beat."

II. *Tula lama;* the literal translation is, "I go to beat," and it signifies an action in which the subject is in course of executing and has not yet finished, similar to the present participle. This verb can also be treated as I. As, however, the auxiliary verb *lama* cannot have a reciprocal form, the termination of this must be added or rather inserted for reciprocal meanings, as, *anunakara turirala lama*, "we are beating each other;" *anunakara turirala litjina*, "we shall beat each other," &c.

III. *Tula tula lama;* a reduplication of the former verb, and therefore meaning "to beat sometimes quickly or hastily." Treatment, the same as the foregoing.

IV. *Tula uma:* the literal translation would be, "I hear to beat," but the usual meaning is, "I beat once." This verb also takes all moods and voices of Table II., Appendix. The conjugation of these verbs can easily be formed, for the main verb, here *tula*, remains unchanged, and after omitting the termination *ma*

secondary verb, *uma* or *wuma*, the terminations of the and voices are added to the root of the secondary verb, as in Table I., Appendix. Only two slight alterations exist, the reciprocal form, which runs thus, *ilinakara turala a*, "we two beat each other once;" *anunakara turala na*, "we beat each other once;" and the other with the positive as well as negative, where the form is not *tula nia*, but *ta tulaunja gunia*, "I shall not beat once;" *ilina rinja gunia*, "we two shall not beat once," &c.

dle Voice: *nukara tulaunja gunia*, "I shall not beat myce;" *ilinakara tula wuririnja gunia*, "we two shall not rselves once."

procal: *anunakara turala wuririnja gunia*, "we shall not ch other once."

Tula albuma or *tulalbuma*, meaning, "arrived at another eating," or "arrived I beat." Conjugation similar to IV.

COMBINED WITH OTHER VERBS OR FRAGMENTS OF VERBS.

ulienama: a peculiar form used before a following Supine, *ulienaka, erina ilutjika*, "I have beaten, that he died."

ve Voice: *Ta tulienama*, "I beat;" *ilina tuliela narama*, wo beat;" *anuna tuliela narirama*, "we beat."

dle Voice: *nukara tulalienama*, "I beat myself;" *ilina ulaliela narama*, "we two beat ourselves;" *anunakara la narirama*, "we beat ourselves."

iprocal: *ilinakara turalienama*, "we two beat each other." er forms obtained by annexing the terminations of Table ppendix.

Tulabuma, "beating by walking about." The complete or "to walk about" is *bala nama;* hence *tulabuma* is only reviation of *tula* and *bala nama.* These abbreviations are ommon in this language, and make it difficult to under- the real meaning of a phrase where this and other similar iations are used. The conjugation is the same as in Table pendix, for *buma* acts as an auxiliary verb.

Tulinja ngama, meaning, "to beat always."

jugation as in Table I., Appendix.

termination of Middle and Reciprocal Voices are inserted ather added to *tula*, as,

dle: *nukara tulalinja ngama*, "I beat myself always;" *ra tulalinja ngarama*, "we two beat ourselves always."

iprocal: *ilinakara turalinja ngama*, "we two beat each always;" *anunakara turiralinja ngama*, "we beat each always."

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CHAPTER X.

Forms of Verbs Combined with the Supine.

In some of these combinations the Supine is easily distinguished, whereas in others it is abbreviated, the meaning showing its existence nevertheless. Again, it is sometimes combined with a simple verb, whilst in other cases it contains other particles. The literal translation is not in many cases absolutely correct, but still sufficiently so to lead to a right interpretation.

As there are only a few of these forms they will be considered *seriatim*.

I. *Tutjikalama*, evidently consisting of the Supine, *tutjika*, and the auxiliary verb, *lama*, "to go," literal translation would be "I go to beat," but the usual meaning is "I beat from above to beneath"—*i.e.*, downward.

II. *Tutjinjama*, where the termination *ka* of the Supine is omitted, and also the secondary verb is abbreviated from *intitjinjama* into *injama*, "to rise or ascend." The meaning of it is "I beat from beneath to above or upwards." However, this meaning is often altered in other verbs, as, for instance, *ilkuma*, "to eat," where *ilkutjikalama* means "to eat in the evening, to sup," and *ilkutjinjama* means "to eat in the morning, to breakfast." The conjugation of both is the same as shown in Table I., Appendix; and the Middle and Reciprocal forms are treated as *tulinja ngama* (see chapter ix.)

III. *Tutjika ma nitjikana*, or *Tutjikamanitjikana*. The particle *ma* receives a very extensive use in this language, as, for instance, *altamalta*, "day by day" or "daily;" *nintamininta*, "one by one;" *putamaputa*, "hill by hill" or "every hill." In the present case it means "again," so that the meaning is "I beat again not being"—*i.e.*, "I shall not beat again." The positive phrase "I shall beat again" they express by *tutjikantema*, where *ntema* means "again." Conjugation similar to above.

IV. *Tutjikerama*, "going to beat," is treated also in the same manner, as are also the two following:—

V. *Tutjilbitnima*, "come to beat," and,

VI. *Tutjalbuma*, "returned to beat.

VII. *Tutjigunala*, a somewhat different form, meaning "to beat by and by, not now." It is different, because, firstly, it is only a form of future tense; and secondly, its conjugation differs, as will be seen by the following:—*ta tutjigunala*, "I shall beat by and by;" *ilina tula narinja gunala*, "we two shall beat;" *anuna tula nuririnja gunala*, "we shall beat."

Middle: *nukara tulala ninja gunala*, "I shall beat myself;" *ilinakara tulala narinja gunala*, "we two shall beat ourselves."

Reciprocal: *etnikara turirinja gunala*, "they shall beat each other."

VIII. There remain only two more of these forms to consider, nd they are not really forms of verbs, but consist only of a article annexed to the Supine, which then gives the verb an- ther meaning. The first is *tutjikatjilala*, "that I may beat uite alone," as, *arbuna inkaraka ta jainama, nukara ilknilitjikat- ilala*, "the others all I send away, that I may wash myself uite alone."

The other is *tutjikatjora* or *tutjikatanga*, both meaning "that may beat.

Ex.: *era erina kwatjuna retingaka, ekurara ilknilitji-* "he him to the water led that he may wash *katjora* or *tanga*. himself."

Neither can be brought into other forms.

CHAPTER XI.

Some other Forms of the Imperative.

Two of these have been seen already in Chapter VII., which an consequently be omitted here. But there are still some thers, which have to be considered, but as there is neither any rregularity as regards conjugation, nor any difficulty in the form, hey need only be specified as follows :—

I. tulatana ! beat !
tula naratana ! beat you two !
tula nariratana ! beat you !

II. tula nalgurai ! beat a little or slowly !
tula naralgurai ! beat you two a little !
tula nariralgurai ! beat you a little !

III. tualgurai ! beat quickly !
turalgurai ! you two beat quickly !
turiralgurai ! you beat quickly !

IV. tuarpa ! beat for certain !
tula nararpa ! you two beat for certain.
tula narirarpa ! beat you for certain !

CHAPTER XII.

Verbs combined with "tutna," and Derivations therefrom.

There are only two expressions with the original form "tutna," which seems to correspond to the Greek optative mood, for it means *to wish or desire to beat.*

The first is, *ta tutna*, "I wish to beat," and the other, *ta tutna nama*, "I would beat, being angry." There is no difficulty as regards conjugation, and they are treated in the same way as other verbs, the only differences being—

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I. In the negative form, which runs thus: *ta tutna gunia* "I do not wish to beat;" *ilina tula naratna gunia*, "We two do not wish to beat;" whilst in the other verbs it runs, *ta tutna nitjikana*, "I would not beat."

II. In the form of Middle and Reciprocal, where the first verb, "*tutna*," takes the general form: *nukara tulatna ilinakara tula naratna*, &c., but the other verb, "*tutna nama*," is treated as shown by Table I., Appendix, viz.
nukara tulatna nama.
ilinakara tulatna narama.

Reciprocal: *ilinakara turatna nama*, &c.

Another verb belonging to this class is, "*ta tuatnama*," meaning, *I beat only a little.*

Other verbs are altered similarly, as, *ta ilkuma*, "I eat;" *ta ilkutna*, "I wish to eat;" *ta ilkwatnama*, "I eat a little."

It is treated like the last-mentioned one, the negative form only being slightly altered, namely, from *tuatnitjikana* into *tuatninja gunia*, however, it is scarcely in use, for they express themselves then positively and say "I beat very much." All other tenses and moods of these are formed regularly.

From this last verb there are derived a number of other forms of verbs, which, as they present no difficulty as regards conjugation, being mostly treated like those above, need not be considered especially, but it will be enough to enumerate them and give the translation. They are the following:—

I. *ta tuatna lama*, "I beat arrived at another place."
II. *ta tualba nama*, "I beat sometimes arrived at another place."
III. *ta tuatnitnima*, "I beat continually."
IV. *ta tualbuntama*, "I beat running away."
V. *ta tuatnauma*, "I beat some."
VI. *ta tuatalalbum*, *ta tulbatuatnama*, *ta tuatilbuma*, all three meaning "returning homeward, I beat on the road" or "between another place and my home."
VII. *ta tuatnalbuma*, "come here" or "hither, I beat," meaning, of course, from the point or place the speaker is standing.
VIII. *ta tuatnilbitnilalbuma*, "returning come near my home, I beat"—*i.e.*, "almost returned I beat."

Of the two forms, *tuatilbuma* and *tuatilbitnima*, it is to be remarked that they are changed in the Middle voice into *tulatulalbuma* and *tulatulilbitnima*, and in the Reciprocal form into *turaturalbuma* and *turaturilbitnima*. The particle of the Dual and Plural, however, is inserted, as is usual, in the auxiliary verb, *nama* or *nima*.

ere are, again, three other verbs which are connected with , as will be seen by the translation—

1. *ta tuanjama*, "returning I beat on the road," which is in Dual and Plural of the Active as well as of Middle and Reciprocal connected with the auxiliary verb *lama*, as, *ilina tunja larama*, *ilinakara tulinja larama*, &c.
2. *ta tuanjilbitnima*, "I beat shortly after started on road going home."
3. *ta tuanjilbuma*, "almost arrived at home I beat."

are regularly conjugated; the particle of the Middle *la* or *li* led to the root of the verb, as *nukara tulinjilbitnima* and *lbuma*.

ere remain only two more forms to be mentioned, which have one meaning, only the latter is augmented—

1. ta tunama.
   ilina tunerama.
   anuna turira nama.

ddle: nukara tula nama.

ciprocal: ilinakara tura nama.

2. *tulbatunama*, "I beat going away quickly."

sponding with the latter is *tuatilbanama* or *ilkwalkilbanama*, eat or eat going away on the road.

CHAPTER XIII.

DRY MOODS AND FORMS NOT MENTIONED IN CHAPTER VI.

ere are some conditional forms which have to be mentioned as they are of frequent occurrence—

1. *ta tumalamikana namara*, I should not have beaten;
2. *ta tumaranga* or *tumalanga*, "I should have beaten;"

r example, *unta nala namanga*, *kalja nuka ilumalamikana ra*, "if you would have been here, my brother would not died," *i.e.*, "if thou had'st been here my brother had not

e first can also be expressed by putting before the conditional the negative word *itja*, "no," as, *itja ilumara*, "had not " or by *tumalikananga*, as, *unta bitjimalikananga*, *kalja nuka ra*, "if thou hads't not come here, my brother would have

ain, the first form can be used without the conditional, *ra*, then meaning, "*not beaten*," or "*because not beaten*;" as, *amalamikana*, *mandera inimalamikana*, "because he was ere, he got no shirt."

hen a question is put to anyone else, the verb takes another as, *woka unta tuikana?* "Why you have beaten not?"

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The same form can also have a conditional meaning, as, fo example, *era ntaineikananga, ta ntainakala,* "because he has no speared, I have done so."

The same form without the termination of the participle "*nga,*" "*tuikana,*" has again another meaning, as, *rula jing entai, ta tuikana,* "give me a stick that I may beat," which i rather a form of optative.

Another form is *woka unta tumarpa,* or perfect *woka unt tukarpa ?* which is a prohibitive form, meaning, "what for yo beat ?" at the same time expressing, *it is not right to do so, an also that the speaker himself saw it, which we cannot express in on word at all.*

Finally, there are still to be specified some forms which ar only either reduplications of the verb, or else augmentations Such are—

I. "*Tutjinabuta tutjinabuta,*" or "*tutnabutatunabuta,*" bot meaning, "I shall beat again."

II. *Tulinja tulindama,*, "to beat always ;" *wulinja wulin dama,* "to hear always ;" *lalinja lalindama,* "to g always."

III. *tulinja mbura,* also signifying, "to beat always."

IV. *tulatulauma,* "to beat seldom ;" *rualilalauma,* "to ru seldom" (water in creeks), as, *mbonta rualilalauma* "The Finke runs seldom."

V. *tuma,* "I have finished beating ;" *ilkuma,* "I hav finished eating." The Negative is expressed by *tuni kana* and *ilkunikana,* "I have not finished beating o eating."

VI. *bitjima,* "to come," but *bitjimalalkura,* "just arrived."

CHAPTER XIV.

Conclusion.

It is evident from the foregoing that the language of thes Australian natives is by no means as simple as many are in clined to think. Certainly, as compared with the languages o other more intelligent races, it is to be called poor ; but the chie cause of this is, according to my opinion, their isolation. Owin to the localities capable of supporting human life being so fa distant from each other, it necessitates a division into very smal fragments of tribes, each often consisting only of a few families However, for objects that they can see and hear of in their daily life, they have words and expressions enough. Take for instance the verb, how many different forms they can obtain from a single verb ! As seen by Table II., Appendix, they can form not less than 300 different phrases.

there are many forms, which have been considered in the
ng chapters, which can be brought into all the moods and
of Table II., Appendix. There are 30 at the least which
thus regularly conjugated, that means, from one mood can
le 9,000 different phrases. There are others again which
ly be used in some moods and tenses, forming about 600
s, so that 9,600 expressions may be derived from one mood,
nly there are some verbs which cannot be conjugated
rly, but are more or less defective. For instance, "to eat"
have either a Middle or a Reciprocal form; but the tran-
verbs generally can be brought into all moods and voices.
se mentioned do not embrace all, but they are those mostly

se pages do not profess to give a complete grammar of the
ge, but merely such an outline as may give a general in-
n of its structure. There are many expressions related
which would require a philologist to classify or properly
e, and any hints in this direction would be thankfully re-
by the writer.
ugh it is scarcely worth while learning the language of
tribes, as their number is small, and it would be much
at once for a missionary to teach them the English
ge, yet how can this be done unless first their language is
tood? For every English word must be first translated to
if they are to properly understand it. Experience has
that many of these natives can speak more or less English,
nen questioned as to the meaning of words, they either are
to answer, or else they give a wrong translation. For
ce, a young man, who gave to all questions put to him the
tereotyped answer, "All right, my boy," most likely heard
xpression once from a white man, and thought it would
r upon all occasions. This only shows how ignorant they
are about the expressions they use, and how necessary it is
n first their language, though it demands a great expendi-
f labour, which, however, carries its own reward in a better
l understanding between teacher and pupil.

APPENDIX.

TABLE I.

SHOWING THE CONJUGATION OF THE AUXILIARY VERB, NAMA TO BE.

INDICATIVE MOOD.

Present Tense.

POSITIVE.

Singular.

jinga nama—I am.
unta nama—thou art.
era nama—he, she, it is.

Dual.

ilina narama—we two are.
mbala narama—you two are.
eratera narama, they two are.

Plural.

anuna narirama—we are.
arankara narirama—you are.
etna narirama—they are.

NEGATIVE.

Singular.

jinga nitjikana—I am not.
unta nitjikana—thou art not.
era nitjikana—he is not.

Dual.

ilina naritjikana—we two are not.
mbala naritjikana—you two are not.
eratera naritjikana—they two are not.

Plural.

anuna nariritjikana—we are not.
arankara nariritjikana—you are not.
etna nariritjikana—they are not.

Perfect Tense.

POSITIVE.

jinga nakala—I have been.
ilina narakala—we two have been.
anuna narirakala—we have been.

NEGATIVE.

jinga nitjimakana—I have not been.
ilina naritjimakana—we two have not been.
anuna nariritjimakana—we have not been.

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Future Tense.

POSITIVE.

jinga nitjina—I shall be.
ilina naritjina—we two shall be.
anuna nariritjina—we shall be.

NEGATIVE.

jinga nitjigunia—I shall not be.
ilina naritjigunia—we two shall not be.
anuna nariritjigunia—we shall not be.

CONDITIONAL MOOD

Present Tense.

POSITIVE.

Singular.

jinga namara—I should be.
unta namara—thou would'st be.
era namara—he would be.

Dual.

ilina naramara—we two should be.
mbala naramara—you two would be.
eratera naramara—they two would be.

Plural.

anuna nariramara—we should be.
arankara nariramara—you should be.
etna nariramara—they should be.

NEGATIVE.

Singular.

jinga namarela—I should not be.
unta namarela—thou would'st not be.
era namarela—he would not be.

Dual.

ilina nala naramarela—we two should not be.
mbala nala naramarela—you two would not be.
eratera nala naramarela—they two would not be.

Plural.

anuna nala nariramarela—we should not be.
arankara nala nariramarela—you would not be.
etna nala nariramarela—they would not be.

Perfect Tense.

Only one form for Present and Perfect.

Future Tense.

jinga nitjinala—I should be.
ilina naritjinala—we two should be.
anuna nariritjinala—we should be.
jinga nitjinala gunia—I should not be.
ilina naritjinala gunia—we two should not be.
anuna nariritjinala gunia—we should not be.

IMPERATIVE MOOD.

POSITIVE.

nai !—be !
mbala narai !—you two are !
arankara narirai ?—are you ?

NEGATIVE.

nitjala—be not !
mbala naritjala—you two are not.
arankara nariritjala—we are not.

SUPINE.

POSITIVE.

jinga nitjika—I must be.
ilina naritjika—we two must be.
anuna nariritjika—we must be.

NEGATIVE.

jinga nitjala nitjika—I must not be.
ilina naritjala nitjika—we two must not be.
anuna nariritjala nitjika—we must not be.

PARTICIPLES.

Present.

POSITIVE.

jinga namanga—I being.
ilina naramanga—we two being.
anuna nariramanga—we being.

NEGATIVE.

jinga nitjikananga—I not being.
ilina naritjikananga—we two not being.
anuna nariritjikananga—we not being.

Perfect.

POSITIVE.

jinga namala—I been.
ilina naramala—we two been.
anuna nariramala—we been.

NEGATIVE.

jinga namalikana—I not been.
ilina naramalikana—we two not been.
anuna nariramalikana—we not been.

Future.

POSITIVE.

jinga nitjinanga—I shall being.
ilina naritjinanga—we two shall being.
anuna nariritjinanga—we shall being.

NEGATIVE.

Wanting.

TABLE II.

SHOWING THE CONJUGATION OF THE TRANSITIVE VERB, TUMA, TO BEAT.

ACTIVE VOICE.

INDICATIVE MOOD.

Present Tense.

POSITIVE.

Singular.

ta tuma—I beat.

Dual.

ilina tula narama—we two beat.

Plural.

anuna { tula narirama, / tulta nama, } we beat.

NEGATIVE.

Singular.

ta tutjikana—I beat not.

Dual.

itina tula naritjikana—we two beat not.

Plural.

anuna { tula nariritjikana, / tulta nitjikana, } we beat not.

Perfect Tense.

Singular.

ta tukala—I have beaten.

Dual.

ilina tula narakala—we two have beaten.

Plural.

anuna { tula narirakala, / tilta nakala, } we have beaten.

NEGATIVE.

Singular.

ta tutjimakana—I have not beaten.

Dual.

ilina tula naritjimakana—we two have not beaten.

Plural.

anuna { tula nariritjimakana, / tulta nitjimakana, } we have not beaten.

Future Tense.

POSITIVE.

Singular.

ta tutjina—I shall beat.

Dual.

ilina tula naritjina—we two shall beat.

Plural.

anuna { tula nariritjina, / tulta nitjina, } we shall beat.

NEGATIVE.

Singular.

ta tutjigunia—I shall not beat.

Dual.

ilina tula naritjigunia—we too shall not beat.

Plural.

anuna { tula nariritjigunia, / tulta nitjigunia, } we shall not beat.

CONDITIONAL MOOD.

Present Tense.

POSITIVE.

Singular.

ta tumara—I should beat.

Dual.

ilina tula naramara—we two should beat.

anuna { tula nariramara, / tulta namara, } we should beat.

NEGATIVE.

Singular.

ta tumarela—I should not beat.

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Dual.

ilina tula naramarela—we two should not beat

anuna { tula nariramarela, / tulta namarela, } we should not beat

Perfect Tense.

Wanting.

Future Tense.

POSITIVE.

Singular.

ta tutjinala—I shall perhaps beat.

ilina tula naritjinala—we two should beat.

anuna { tula nariritjinala, / tulta nitjinala, } we should beat.

NEGATIVE.

Singular.

ta tutjinala gunia—I shall perhaps not beat.

ilina tula naritjinala gunia—we two should not beat

anuna { tula nariritjinala gunia, / tulta nitjinala gunia, } we should not beat.

IMPERATIVE MOOD.

POSITIVE.

Singular.

tuai—beat.

Dual.

tula narai—you two beat.

Plural.

tula narirai, / tulta nai, } beat you.

NEGATIVE.

Singular.

tutjala—beat not.

Dual.

tula naritjala—you two beat not.

Plural.

tula nariritjala—beat you not.

Supine.

POSITIVE.

Singular.

ta tutjika—I must beat.

Dual.

ilina tula naritjika—we two must beat.

Plural.

anuna { tula naritjika / tulta nitjika } we must beat.

NEGATIVE.

Singular.

ta tutjika gunia—I must not beat.

Dual.

ilina tula naritjika gunia—we two must not beat.

Plural.

anuna tula nariritjika gunia—we must not beat.

PARTICIPLES.

Present.

POSITIVE.

Singular.

ta tumanga—I am beating.

Dual.

ilina tula naramanga—we two are beating.

Plural.

anuna { tula nariramanga, / tulta namanga, } we are beating.

NEGATIVE.

Singular.

ta tutjikananga—I am not beating.

Dual.

ilina tula naritjikananga—we two are not beating.

Plural.

anuna { tula nariritjikananga, / tulta nitjikananga, } we are not beating.

Perfect.

POSITIVE.

Singular.

ta tumala—I was beating.

Dual.

ilina tula naramala—we two were beating.

Plural.

anuna { tula nariramala, / tulta namala, } we were beating.

NEGATIVE.

Singular

ta tumalikana—I was not beating.

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Dual.

ilina tula naramalamikana—we two were not beating.

Plural.

anuna tula nariramalamikana—we two not beating.

Future.

POSITIVE.

ta tutjinanga—I shall be beating.

ilina tula naritjinanga—we two shall be beating.

anuna { tula nariritjinanga, / tulta nitjinanga, } we shall be beating.

NEGATIVE.

Like Future in Indicative Mood.

Middle Voice.

WITH SOME RECIPROCAL FORMS.

INDICATIVE MOOD.

Present Tense.

POSITIVE.

Singular.

nukara tulakna—I beat myself.

Dual.

ilinakara tulala narama—we two beat ourselves.

Plural.

anunakara tulala narirama—we beat ourselves.

etnikara turirama—they beat each other.

NEGATIVE.

Singular.

nukara tulitjikana—I beat myself not.

Dual.

ilinakara tulala naritjikana—we two beat ourselves not.

Plural.

anunakara tulala nariritjikana—we beat ourselves not.

etnikara turiritjikana—they beat each other not.

Perfect.

POSITIVE.

Singular.

nukara tulakala—I have beaten myself.

Dual.

ilinakara tulala narakala—we two have beaten ourselves.

Plural.

anunakara tulala narirakala—we have beaten ourselves.
etnikara turirakala—they have beaten each other.

NEGATIVE.

Singular.

nukara tulitjimakana—I have not beaten myself.

Dual.

ilinakara tulala naritjimakana—we two have not beaten ourselves.

Plural.

anunakara tulala nariritjimakana—we have not beaten ourselves.
etnikara turiritjimakana—they have not beaten each other.

Future.

POSITIVE.

nukara tulitjina—I shall beat myself.
ilinakara tulala naritjina—we two shall beat ourselves.
anunakara tulala nariritjina—we shall beat ourselves.
etnikara turiritjina—they shall beat each other.

NEGATIVE.

The Negative is formed by adding "gunia," as,
nukara tulitji gunia, &c.

CONDITIONAL MOOD.

Present Tense.

POSITIVE.

Singular.

nukara tulamara—I should beat myself.

Dual.

ilinakara tulala naramara—we two should beat ourselves.

Plural.

anunakara tulala nariramara—we should beat ourselves.
etnikara turiramara—they should beat each other.

NEGATIVE.

"gunia" to be added to the positive.

Perfect wanting.

The Present Tense used instead.

Future.

Singular.

nukara tulitjinala—I shall beat myself.

Dual.

ilinakara tulala naritjinala—we two should beat ourselves.

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Plural.

anunakara tulala nariritjinala—we should beat ourselves.
etnikara turiritjinala—they should beat each other.

NEGATIVE.

Formed by adding "gunia."

IMPERATIVE MOOD.

POSITIVE.

Singular.

unkwangara tulai !—beat yourself !

Dual.

mbalakara tulala narai !—you two beat yourselves !

Plural.

aragankara tulala narirai !—beat yourselves !
aragankara turirai !—beat each other !

NEGATIVE.

Singular.

unkwangara tulitjala !—beat not yourself !

Dual.

mbalakara tulala naritjala !—you two beat not yourselves !

Plural.

aragankara nariritjala !—beat not yourselves !
aragankara turiritjala !—beat not each other !

Supine.

POSITIVE.

Singular.

nukara tulitjika—I must beat myself.

Dual.

ilinakara tulala naritjika—we two must beat ourselves.

Plural.

anunakara tulala nariritjika—we must beat ourselves.
etnikara turiritjika—they must beat each other.

NEGATIVE.

With "gunia" added.

PARTICIPLES.

Present.

POSITIVE.

Singular.

nukara tulamanga—beating myself.

Dual.

ilina tulala naramanga—we two beating ourselves.

Plural.

anunakara tulala nariramanga—we beating ourselves.
etnikara turiramanga—they beating each other.

NEGATIVE.

Singular.

nukara tulitjikananga—I not beating myself.

Dual.

ilinakara tulala naritjikananga—we two not beating ourselves.

Plural.

anunakara tulala nariritjikananga—we not beating ourselves.
etnikara turiritjikananga—they not beating each other.

Perfect.

POSITIVE.

Singular.

nukara tulamala—I was beating myself.

Dual.

ilinakara tulala naramala—we two were beating ourselves.

Plural.

anunakara tulala nariramala—we were beating ourselves.
etnikara turiramala—they were beating each other.

NEGATIVE.

Singular.

nukara tulamalikana—I was not beating myself.

Dual.

ilinakara tulala naramalamikama—we two were not beating ourselves.

Plural.

anunakara tulala nariramalamikana—we were not beating ourselves.
etnikara turiramalikana—they were not beating each other.

Future.

POSITIVE.

Singular.

nukara tulitjinanga—I should beat myself.

Dual.

ilinakara tulala naritjinanga—we two should beat ourselves.

Plural.

anunakara tulala nariritjinanga—we should beat ourselves.
etnikara turiritjinanga—they should beat each other.

NEGATIVE.

Expressed by adding "gunia" or "itja."

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VOCABULARY.

A

aai (interj.), hear !
abula, somewhere else
agala, pale
airima, to see
airilalabuma, to look round, look about
akutnama, to lift the arm for beating
albula, till
albolja, very old
ala, the nose
alama, the liver
alatjura, nostril
alaurba, the bone of the nose
albanata, cloudy, dark
albalbaka, first part of the summer
albantiuma, to throw abroad
albara, young, healthy
albmelama, to answer, to tell
albuma, to return
algabma, poor, meagre
algala, pale
algara, green-shining like emu eggs
alinama, to be taken with convulsions, dying
alinga, the sun
alinja, the tongue
alinta, flame
alkanama, alkanalama (refl.), to vomit
alkaralkara, shining, clear
alkielba, transparent
alkira, bright, not cloudy
alkirabinjanga, high
alkna, eye
alknagoda, eyeball
alknailpula, eyelash
alknajinba, eyelid
alknajunta, the orbit
alknalginja, awake
alknanbuma, alknalgama, to bloom, to flower
alknalanbanama, to look angry
alknalurara inbuma, to overlook
alknatuma, to burn
alknaltara, clean, clear
alknatera, public
alknanterama, to torment
alknaralama, to look backward
alknatera airima, to see the thing itself
alknantangera, like fire
alknanta, blood-thirsty
alknanta, the temple
alknenera, a beetle
alknenta, sideways
alknentama, to look sideways
alkniltera airima, to squint
alkningera, eyebrow
alknira, evening
alknolja, tears
alknortja, embryo
alknotna, jealous
alknultinkama, to drown
alkultakakulterama, to feel disgust
alkura (comp.), more
alta, daylight
altagatjagatja, moonlight
altabatera, twilight in the morning, daybreak
altagalta, free
altalinama, altalinanama, to snap
altama, to pull out (feathers)
altamalta, daily
altarama, to find
altjiuma, to flow over
altjura, a hole
altola, west
altolakwa, western
alua, blood
alululama, to bleed
ambarinila, immediately
ananta, exhausted
anbuma, to touch with the hand
anbalanbalama, to enquire, to investigate
anbaela, anbara, then, there on
andera, fat
angnera, the face
angna, seed, fruit
anjua, nest
ajua, an old man
anka, green, unripe
ankalabum, to hum (as insects)
ankama, to speak
ankaratjauma, to revolve
ankatauma, ankatalama, to turn round, to whirl
ankataritjalama, to turn himself round
ankatala, thirsty
ankatamea, a drink
ankata, the cloud
ankatiuma, to roll
ankatja, language, sound
ankielta, guest
ankua, sleepy
ankuerama, to go to sleep
ankuindama, to sleep
ankurilama, to be contented

anma, in a long time
anmangaletakata, long living
antaka, wide, broad
antakira, south
antakirakwa, southern
antakerama, to become wide
antangalama, to stray, to lose himself
antanama, / antalabuma, } to steal upon
antata, flower
antina, opossum
antjitataka, joyful together
anuna, we
apma, the snake call
arailama, / aroitama, / arilberitjama, } speaking low, to whisper
arailabuma, to look after or round
aralbuma, to evaporate
araltama, to forbid
arankama, to cry, to scream
araltagama, to cut, to prune
aranbouma, to mock
arankara, you
aragankara, yours
aratja, / aratna, } straight, right, true
araltutjaltutja, bold, daring
aranta, tired
arabmaramara, the palate
aranga, grandfather
aragata, mouth
ara, wrath
aragutja, woman
aralitja, a stick
arankaia, palmtree
aramatula, a parrot's bill
aranbilama, to distribute
aranjikama, to challenge
arauna lama, to go to enemies
aranelilama, to greet, to salute
arartilama, to defend
aratalila nama, to lead out
ararama, to choose, to select
araratala tuma, to punish
arartankama, to defend with words, to excuse
araierama, to long for
aratama, / aratinjama, } to arise (as the sun)
aratinjalama, to come or go out
arbarnaninja, in some time
arbalama, to know not
arbmanama, to create
arbmanarinja, Creator
arbmaninja, creature
arbunarba, that
arbukarba, those
arbuntarpa, obstinate
arbuna, / arbukarpa, } another
arbuma, to hew, to trim
aregna, name
arelbilama, to sharpen, make sharp
arelguma, to compel
areola, outside
arelba, sharp
arenka, too quick
areratna nama, to make angry, to vex
arerama, / arilerama, } to become angry
areba, / albara, } wooden tray
argalaworkala nama, to poison
argana, joy, pleasure, play
arganabiljabilja, kind, smiling
argana, joyful, glad
arganabutanga, very joyful
arganerama, to become glad
arganilama, to make glad
argulargua, owls
argutilama, to hear, to hear over
arina, there
arita, solid, firm
arilabatia, eatable
arilamata, sandy
arinta, angry
ariltjirka, a sucker on trees
arila, sand, earth, land
arilarkna, clay
arilinga, the jaw
arinbinba, the lip
ariljitna, / arilatna, } the lungs
arilanbuma, to quarrel, to dispute
arilerama, to decay
arinama, to put
arinilanama, to put
arilgama, becoming day
arkanama, to taste, to try
arkaninjagaba, taste
arknamanalama, to agree
arknantaiuma, to protect
arknanterama, to hold up
arkatnia, industrious
aroa, rock-wallaby
arotuma, to press
artata, hard, firm
artjarerama, to determine
artjanbuma, to stamp with the feet
artjilanama, / artja nama, } to depart, to go away
arugula, first
arungulta, poisonous

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aruilkara, a white cockatoo
arunama, to beat an innocent one
atanja, in spite of
atmunka, rats
atna, dung
atnindurka, the rectum
atua, a man
auma, to hear

B

babuterama, to cease
babauma, to catch, infect (sickness)
bailka, a bag, the bark of trees
bailkiuma, to strip off the skin, to bark
bailbilama, to lose
bakana, finished
bala nama, to walk about
bala lama, to stray
balaka, content
bala, wrong
balkala, in vain, useless
balkama, to bleach (flowers)
balatama, shy, timid
balaka, improvident
balka, pale
balia, distant
balba-barbuta, strange, indistinct
balera nama, to go astray
balkala ntema, to give to the wrong one
balkara, blue dove
balteratjata, slippers worn to conceal trail
batula, the pouch of kangaroos
balupa, the shoulder
baluka, bread
banama, to build, to paint
banalama, to paint himself
bangerama, to become blind
banga, blind
banba, everywhere
bania, small-pox or measles
banta, bakala, } wooden trays
barkuma, to assist, to help
baritjulba, mushrooms
bara, a tail
baeta, the tail of a snake
bartja, shining
bartjima, to shine, to glare
bataba, peaceable
batakerama, to turn (wind)
batakilama, to instruct
batalilama, to show the road, to call back
batakilama, to remember, to recollect
batalilama, to bend the knees
baterama, to go backward, to turn away
batama, cannot
bateatapa, impossible
bauma, to thrust, to knock down
bebilama, to calm, to quiet
belkua, again
benja, a spring of water, permanent water, salt-water
bira, red gum-tree (eucalyptus)
birka, charcoal
bitjima, to come
bitjalbuma, to come back, to return
boanka, breath
boankama, to breathe
bokarabokarerama, to stagger, to tumble
bola, saliva
boliuma, to spit
boilama, to blow
borerama, to be ashamed
borilentama, to flash
bota, a ball
bolda, a blister
botera, short
bora, shameful, sorry
borka, tired
bonta, blunt
bokarabokara, boggy, swampy
botilama, to make balls
boterama, to drain (water)
bula, but
bulknala, immediately, directly
bulja, loose, soft (sand)
bulkna, without intention
buka, perhaps, likely
bultabulterama, to get full of bladders
bultingama, to burst asunder
bultinjirkerama, to perish by thirst
bunabuna, empty
bunabunerama, to cover with dust

D

dalbadalba, shells, mussel-shells
dama, to grind (between two stones)
damba, loose, breakable
dana, cold
dantama, to close, to shut
datilama, to make wet, to moisten
data, wet, moist
data, soon
datagunama, to conquer, to overwhelm
deta, detja, teeth
detalura, the gums
debadeba, birds

dirkadirka, green (colour)
dolta, tired
dolka, low, horizontal
dotadota, short
dolterama, to become tired
dueda, another
dueterama, to change, to make a mistake
duetagudeda, different ones

E

eamitja, a deep hole
ebminja, useless
ebminjerama, to become useless
ega, scab, scurf
egunja, ashes
egnakalinga, different, unequal
egnarbegnarba, from all directions
egnagegna, single
egna, alone
egnagegnilama, to separate, to unfold, to make asunder
egutnanama, to catch up
ekaltilama, to fix, to make firm
ekalta, strong, firm, powerful
ekaltanumerumera, very strong, almighty
ekna, very sick, stiff
eknira, east
eknirakwa, eastern
eknakarinja, family
ekunama, to fetch
eknuma, to marry
ekarama, to dress
ekura, his
ekuratera, there are two
elgata, hill, mountain, ridge
enkua, almost, nearly
enta or anta (suff.), only
era, he
eratera, they two
erama (aux. verb), to become
eraginja, chaste
erapera, bent backwards
eraitinga, the comb of birds
eranbutinama, to circulate (reports)
erabukama, erabakanama, to go round anything
eraganama, to hunt
erankerama, to grind with the teeth, being in wrath
ererentama, to borrow
erauia, weapons
erguma, to hold, to keep
erilkna, dead
erinta, cold
erila, man
erilknabata, ancestors
erinja, devil
eritja, eaglehawk
eritjinta, the Southern Cross
eroutja, an ulcer, an abscess
eroaltjatuma, to revenge
eroanberama, to disperse (clouds)
eroatja, light, cloudy
erora, young, fresh
erouma, to tremble, to shiver
erunjutna, dark, overcast
erunja, liberal, munificent
eruntarerama, to go out of the way
erukanerama, to get excited
erukanilama, to excite
erunjauma, erakama, to tremble (in general)
eta, the throat
etakama, to flee, to run away
etaliralabuma, to remember
etalingetala nama, to understand
etalingetala, reason
etama, to make fire
etalirama, to recolleet
etaeta, stupid
etalinga, yet, in spite of
etapatikana, far away
etatja, slanting
etatagia, dangerous
etatnama, to choke, to strangle
etata, alive
etera, the shore
eterama, to become deaf
etna, they
etnetnauma, to tell, condemn, or curse
etnika, their
etopala, outside
etopa, a belt
etopatopa, an edge
etopalerguma, to gird
etopalergulama (refl.), to gird
etuanama, etuilama, to mince (meat)
etuaratuarabenama, to boast
etulbmerama, to be suffocated
etuna, very warm, hot
etuanga, bold, courageous
ewolama, to lean against

G

gabmara, the top of the head
galagala, mistaken
galagalerama, to be on or go a wrong way
galtja, wise, knowing
galtjerama, to become wise to teach
galtjentama, to make wise, to teach
gama, to cut

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galkata, the bud (of flowers)
gamba, delicate, well-tasting
galtjentanentana, a teacher
gara, meat
garra, clay-ground
garilkama, to cry out, to weep
garknanteulama, to penetrate
garalima, to expect something or someone
gartja, sharp, cutting
gata (suff.), with
gatala, outside, open, clean
gatairima, to look into
gatilama, to make open, clean
gataterilama, to cut off
gaterinama, to begin, to start
gaualama, to swing
gninama, to lend, to borrow
gnama, to dig
gnagnignama, to dig deep
goda, an egg
godna, ignorant, unwise
gola, hair, long hair
goltama, to cover, to protect
goltalama (refl.), to cover himself
guierama, to wink, to make a sign
gulelberama, to get stiff
gulatja, ornament for the neck
gultja, ornament for the arm
gunama, to put into
gunbanama, to be lazy, idle, innocent, not active
gunba, lazy, idle, not active, innocent
guruna, the soul
gutaka, left hand
gurunga, gurungatjina, } then, after that
gurknalilama, to forbid

I

ibatja, milk
ibatjangna, breast (of females)
ibarkna, the pleura
ibinja, a stranger
idunta, the stomach
ikala, dough
ikalilama, to make tough
iknima, to fall, to fall off
iknitjikalama, to fall down
ilalima, to offer
ilama, to say
ilangara, what time?
ilbangintala, obstinate, disobedient
ilbaleala, safe, saved
ilbirtja, gray
ilbatjaltjura, willing, obedient
ilbminta, powerful
ilbakutaka, willing, industrious
ilbarurtmurka, inaudible
ilbunkara, not smeared with fat or colour
ilbarilbera, shortly before evening
ilbanama, to accuse
ilbarinama, to teach, to tell
ilbararanama, to hang up
ilbankama, to know
ilbaleala nama, to be safe
ilbaiuma, to doubt
ilbmarawuma, to babble
ilbamba, a carcass
ilbirba, large leaves
ilbula, small leaves
ilbminta, power, strength
ilba, the ear
ilbatopa, the ear-lap
ilbanta, general rain
ilbmara, dew
ilbalunga, intia, } a cave
ilelilalama, to paddle, to dabble
ilgaia, the cheeks
ilgagama, to outwit
ilgarkama, to be frightened or alarmed
ilganama, to sift, to winnow
ilgulilgulalama, to walk about
ilgulelgua, in all directions
ilgaginja, cunning, sly
ilga, quiet, settled
ilitja, green, unripe, under-done (meat)
ilelalbuma, to dictate
ilimbina, a leader, hero
ilia, an emu
iliapa, feathers of emus
ilirtja, a furrow, a trench
ilinja, a song
ilima, to sing
ilina, we two
ilirtjilama, to burst through (water)
ilingauma, to twist
ilkagama, to call attention to
ilkama, to call or cry out
ilkatjintama, ilkatnatjintama, } to crow
ilkaterama, ilkatinjama, } to ache
iltaratuma, to knock at (a door)
iltama, to quarrel
iltarba, sorry, sorrowful
iltjakiltjirka, ugly
iltjanja, beefwood
iltja, the hand
iltjaganja, the finger
iltjerama, to rest

ilulama, to dress out, to undress
ilulinjalama, to climb down
ilunama, to extinguish (fire)
iluma, to die, to go out (light)
iluma, to dry up (water)
imalalguia, imalalkura, } in great danger, unsafe
imanka, long time before
imankinja, very old
ima, condemned to die
imanama, to hand over to, to offer
imaralama, to dash (small waves)
imatoalima, to dash (large waves)
imateuma, to roll up
imambula, danger
imbara, a sign, track, annual rings of trees
imbulkna, a scar, a mark
ilkata, pain
ilkapala, full (moon)
ilkatilama, to cause pain
ilknariuma, to skin
ilknima, to wash, to wipe away
ilknagama, to force away
ilknuinama, to castrate
ilknilbiknima, to stagger
ilkwaterilama, to help, assist, to accompany
ilknakama, to divide, to separate
ilkwatera, assistance, companionship
ilkankula, storm
ilknira, naked, poor
ilkaunkuanta, quick
ilkna, wet, moist
iloutja, miserable
ilotuma, to throw down
ilpanama, ilpulangalama, } to fly
ilta, a hut, a house
iltariuma, to crack
iltarkama, to rattle
iltarkalilama, to make a rattling
iltirbminjatuma, to beat time
ilulitijikatjila erauma, to tremble with age
imbaninbana, cautious
imbanintuma, to have pity
imbuma, to let, to permit
imbulama, to leave (act)
imbalalbuma, imbalalama, } to forsake, to leave
imilama, to condemn
impanama, to sift
inola, a spider
inalbuma, to take back
inanga, the arm
inara, patiently
inankala, wise, knowing
inbanama, to pass or go over
inbora, heavy
inbotna, hail-stones
inbirka, centipede
indota, clever
indora (superlative), very
indotilama, to adorn
indaltja, grasshoppers
indama, to lay down, to belong
ingalama, to beget
ingama, to roar (as animals)
inguia, old
ingutnala, in the morning
ingunta, to-morrow
inguntarbuna, the day after t morrow
ingua, night
inguarinja, inguarakwa, } a night walker
ingartja, a deep track
ingununga, maggots
inilalama, to get
ininga, beard
inima, to fetch
injakarilama, injakarauma, } to load upon
inkanja, shoulder
inka, the foot
inkatnita, the sole of the foot
inkaganja, the toe of the foot
inkalura, a hoof
inkarinka, a ladder
inkanja, a prayer
inkainama, to erect
inkariknima, to run out (water)
inkailalama, to fly up
inkama, to beg
inkalerama, to look angry, to h come wicked
inkirililama, to make noise
inkanindama, to commit adulte secretly
inkutilama, to bend
inkantama, to follow the track, track
inkaraka, inkana, } all
inkana, (also meaning) the last
inkilja, wicked, ugly
inkara, safe, without danger
inkutinkuta, crooked, bent
inkarinkara, slender, thin
inkarinjaka, altogether
inmanmaraulama, to shake the he
innara, waves, mistletoe
intitjera, frogs

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intjaginja, poison tooth, the Magellan clouds
intoala, honey
intitja, sacrum
intalinja, Scripture
intalingagata, painted, coloured
inturka, fearless
intita, stink
intira, quick
intjirka, dry (grass)
intarinja, untransparent
intjaka, away
intitjinjama, to arise (smoke)
intjamauma, to unfold
intalelama, to write, to make signs
intarama, to snore
intjakalama, to go away
intarinjilama, to unite, bring together
intitakerama, to mimic
intitakerama, to speak for one
intunama, to fell (a tree)
intarerguma, to couple together
ipitalukaluka, rough, uneven
ipita, deep
irala, cast-off skin of a snake
iranta, black cockatoo
irakira, a sign
irbaltangirbalterama, to dare
irbunga, fishes
irbuma, to set (sun), to dip under water
irbukalalama, irbunama, irbunjama, to go into
irboterama, imbulknerama, to recover from sickness
irbanjairima, to look into
irbonba, all gone, doubtful
irbota, peaceful
irbonberama, to cease giving away
iregeririlama, to make ashamed
iregerirama, to be ashamed
irgarama, to scrape
irgungalalama, to pass over close by
irgapa, desert-oak *(Casuarina Decaisneana)*
irgua, pus
irgalanga, a skeleton
irgalla, a knife made of stone
irgatagama, to smart the eyes (as by smoke)
irgaiilama, to blind the eyes (as by the sun)
irgaia, invisible
irkwanta, courageous
irkitjawama, to spin
irknala, bark of trees
irkitja, worsted, a string
irkna, the husk of seeds
iroamba, disappearing, temporary
itangurula, the same number, equal
itaka, loose, shaking
itarinama, to catch
itaringama, to lead
itarinama, to pull, drag, or tear
itatjata ntema, to give again
itia, younger brother or sister
itiinjara, brothers and sisters
itinjalama, itinjanama, to overtake (running)
itinja, there, close by
itinja, close at hand, very close
itja, no, none
itnima, to weep
itnora, shy, afraid
itoa, wild turkey
itapmara, the nails of the fingers and toes
iwupa, the web of a spider
iwuna, what?

J

jara, ants
jaramba, edible eggs of ants
jabera, pieces of bark to play with
jalta, coal
jainama, to send
jarauma, to peel
jalama, to think, to mean
jarinama, to bring thither
jakularilama, jabajaberama, to enquire
jaralama, to search for
jakmama, to look at in astonishment
jakama, jakalilama, to persuade
jartja, without branches
jalknajalkna, very bright
jalbajalba, with long hair
jana, and anka, cannot hear
jatama, to be frightened
jealbmelama, to give notice, to betray
jerentama, to exchange
jeriuma, to scrape off
jia, message
jinba, skin
jibunakana, a liar
jirira, north
juntama, to search
jibalilama, to deceive
jibarinama, to abnegate, to excuse
jibarinalama, to deny, to excuse himself
jinima, to bind

jinilama, to refuse
jilbainama, to twist round (as snakes)
jibuma, to lie
jirama, to cease
jiranama, to disappear
jitalilama, to bend
jinga, I
jirkna, spiteful
jirirakwa, northern
jotia, heavy
juka, I don't know (probably an abbreviation)
jurka, bridle

K

kata, father
katailtja, one's own father
katalira, foster-father
kantirkna, the breasts of girls
kanta, ice, cold
kantakanta, round, a ring
kankinja, love, kindness
kankananka, a lover
kankinjaka, kankalta nama, } beloved
kaluka, a ram, bull
kakuta, a sort of hat
kaputa, the head
kakalala, white cockatoo
kabiljalkuna, pelican
kabuluma, to break, or make open
kabanentantema, to give gratis
kabia lima, to walk softly
kakabanama, to announce or give notice
kalkukalama, to halt, to limp
kankama, to love
kantatuma, to fix, to fasten
kankuerama, to obey
kantanama, to twist
kanjalbuma, to make a spear
kangalangalerama, to drown
karuntama, to dance, to stamp with the feet
katelanama, to close the eyes
katnalilama, to bring anything high up, to erect
katauliuma, to throw outside
katanairima, to look outside
katitjalama, to roll
katjikatjilama, to tickle
katjiamalkura, childish
kuralja, katitjina, } Orion (stars)
kana (the negative particle)
kala, enough
kankia, idle, lazy
kankinja, kind
katna, above
katninga, over, upon
katnantupa, katnanta, } against
kara, awake
keltja, a half, a piece
keltjilama, to halve
kieka (suff.), on, upon
knira, large, big, very
knota, whole
knirinjara, very much, very
knirerama, to become big
knuerama, to forget
konja, sad, sorry, mournful
kokuma, to bite
kokitjagama, to embrace
konjerama, to become sad or
konjilama, to make sad or sor
kotjima, to gather
kotikama, to take down
kulkura, sweat
kumerama, to rise or wake up
kumeralama, to arise from be
kumililama, to awake
kumalilanjalbuma, to fetch ro
kumia ntjainama, to smell sw
kunerama, to become bad
kunabinjalama, to charm
kurkerama, to become small
kubitjakubitjalama, to da pieces
kuterama, to remain
kutetalirama, to keep in r brance
kurka, little, small
kuta, always
kumia, sweet (water, of taste)
kuna, bad, sin
kumalinga, never
kwana, inside
kwaninguna, to set aside
kwanginga, left hand
kwatjakwatja, liquid
kwamalaria, safe, without da
kwanama, to swallow
kwaniralakalima, to plunge water
kwarinama, to hear or attend
kwatjenkama, to thunder
kwatja, water, rain
kwatjaluralura, heavy rain
kwatjatnoatnoa, light rain
kwara, girl
kwatjambenka, a water-flood
kwatjabara, lightning
kwenja, protection

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L

la, lela (suff.), in, on, by, with, upon
labalilama, to roll into
labulbarerama, to die by starvation
lainama, to shake off
lainkerama, to fly away
lalknilama, to make ready
lalerama, to threaten
lalilama, to bring forth
lalerutnuma, to mix, to unite
lalama, to reject, to repulse
lamaknirilama, to be in debt
lanalabuma, to earn, to gain, to deserve
lanalama, to burst
lankarama, to know, to perceive
lankama, to blame
lama, to go
lanbuma, lanbilalama, } to flow over (water)
lankurutnama, to be embarrassed
langama, langerama, langarilama, } to mix
laragulara lama, to meet
larbiuma, to grind on a stone
larerama, laralama, } to swim (as men)
larabalanama, to swim (as birds)
laralabuma, to swim (as fishes)
lakakia, a close relation
lada, a branch, a point
lalta, liqueous earth
lalkira, a stick put through the nose
lalkinta, the germ
lanba, under the arm
lankalaria, knowledge
lankeia, a monster, a hideous man
latjia, jams
lamaknirilinja, debt
larabilara, rushes
lara, a creek, the Milky Way
laralilama, to wash away
lauma, to hide away
ladna, many
lalkna, ready, in order
lakina, so, this way, like this
lakinja, so many
lanjalanja, precious
laragulara, again
lata, to-day, soon
latinja, new
lauala, alike, all the same
leltja, an enemy
lelterama, the waning of the moon
lelgerama, to slide, to conquer
lebmerama, to refuse, to retract
lerama, to desire, to long for
lelgeranama, to crackle
lebmintjerama, to leave behind (property of one deceased)
lelama, to promise
lenkuelama, to adorn
lenkunjalilama, to adorn himself
lelingintama, to admonish
lena, this
lenkina, you, thou
lelba, stiff
lelka, smooth, even
lelta, half (moon)
lenkutja, lenkunja, } pretty, handsome
leoa, downward
lgurbma, foam
lgurbilama, to foam
lima, perhaps
linganginika, unruly
lira, none
lingiriuma, to press out
lingiuma, to plait
lilbalenkuelama, to give willingly
lilingerama, to boil
litna, the forehead
liorkna, a sucker on a tree
llanta, a vine of a creeper
llanterama, to creep (as vines)
lona, thick, broad
longa, far distant
longakalonga, far away from each other
loiloa, bad tasting
lola, the bottom
loatjira, a lizard
longura, the grass-tree
lora, grandmother
lodakama, to pick out
lolguma, to refuse, to reject
lowuma, to wipe out
lorilama, to water, to drink
loanilama, to stir
lolouma, to despise
louma, to wash
ltarbatuma, to clap with hands
ltarama, to crackle
ltalderama, to rot
ltirama, to wound
ltjumburknerama, to cease growing
ltarkalama, to rattle
ltarauma, to pinch, to twitch
ltirkna, healthy, bold, aloud
ltatjiltatja, one, alone
ltumba, able, skilful
ltirba, sorry, sad

ltalba, lulbalulba, lumanamana, } full
ltalda, rotten
ltjanma, cray-fish
ltulba, the instep
lturkna, a crack
ltumba, skill, ability
lturkarauma, to foretell, to predict
lurra, not thirsty
luara, against
lutula, short
lubata, unwilling, obstinate
lunkura, diverse, different
luaela, intentional
lunbatunbata, surly, sulky
luma, to untie, to loose
luralama, to swell
lunga, shade, a hut
lupara, the upper part of the leg
lurkna, the veins, sinews
lurinja, a stranger
lurbaka, winter
luaila, intention
lukultmunta, misty rain
lutjula, lukuna, } there
lulilakalama, to go downward
lupatilama, to keep, to retain
lularatama, to become thick
lunkurilama, to penetrate, to distinguish
lunerama, to catch, to seize
lurkutankama, to slander
lupaterama, to sulk
luarerama, to turn himself to one
lurkninama, to charm
lunbatunbaterama, to grumble, to become sulky
luailerama, to intend
lurkneritjilama, to stop

M

mama, a wound
mana, bread, vegetable food
manga, flies
mandera, clothes
maia, makura, } mother,
mangabara, the ghosts of enemies deceased
mainama, to hold or keep fast
makerama, to spare, to avoid
makeralalbuma, to return unsuccful
mamilama, to wound
mangalima, to drive away flies
mankama, to grow
mankatjintama, to grow up
mankalerama, to get entangled
mankilama, to finish
mantilama, to shut, to close
marerama, to become good
marilama, to make good
maijinga, good, moral
makalaria, not good to eat or dri
makalaria, dangerous
mala, female
manta, closed, blunt, deaf
manka, finished
manderagata, with clothes, *i.* clothed
mara, good
matia, matitja, } entangled
mata (part.), full
matera, { ornament for the neck, light clouds
mbailitunkara nama, to kneel dov
mbakama, to pull out
mbakarinama, to unite
mbakanama, to lean against
mbakatninama, to snap
mbakalama, to burst open
mbalilama, to act badly, to sin
mbangaralama, to double
mbanama, { to bear a child, to bree to lay eggs
mbankama, to groan with pain
mbangaraterilama, to make tw single ones to pair
mbarkama, to shine
mbarama, to make, to feel
mbakata, open, clear of timbe bare
mbala, you two
mbāla, very bad
mballa, warm
mbanka, tough
mbarkinja, bright, shining
mbanja, matrimony
mbantika, a plain
mbala, sin, wrong
mbangara, a pair
mbalaka, summer
mbanjambanja, a mouse
mbenka, a flood
mbenja, a place
mbitjera, an owl
mburkagatilalama, to make visibl to reveal
mbenbalalbuma, to go or pass ove
mbeltjerinama, to compare
mbeltjilama, to throw together
mbomberama, to nurse (sick ones)
mbenka, large (fire or water)

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mbogulba, short
mburkagatala, evident, open, visible
mbultja, innocent
mbobula, in the middle
mbola, the middle
mbobiputaputa, a multitude
mbultjama, diarrhœa
mbultjita, Capparis Mitchelli (tree)
mburka, the body
mitja, fire, firewood
molbamanalama, to wedge his way through
molbamainalilama, to wedge, press a thing through
monjamonijilama, to have pity
menta, sick, ill
monja, slowly
multitja, reeds
mulknura, worsted spun of hairs
murulunga, mononga, } Duboisia Hopwoodii ("pituri-" tree)

N

nama, grass
nanka, the chest
nankarakara, pain in the chest
nala, here
nalka, satisfied, no longer hungry
nangera, erect, straight
nana, this
natera, these two
nanankana, nanirbera, } these
nanta, an overloaded stomach
nakagata, so big
nalbatnauma, to invite, to press
naltanalterama, to meet, to see each other
naltauma, to throw on one heap
naltairima, naltanaltairima, } to see each other
namilama, namerama, } to alter, to change
nananeulama, to roll himself
nangeralalama, to soar (as birds)
nantalerama, to cease
nankalilama, to stamp with the feet
nangilindama, to turn oneself on the side during sleep
nanterama, to fill the belly
narguma, to press out
natalilama, natalatalilama, } to dissuade one
natama, to dislike
nurama, to rub out seeds
natata, a scorpion
nbanka, remained
nborba, slippery
nbunjala, back
nbata, a stalk of grass
ndolja, picture, likeness
ndolka, a fork, branch
ndolkarinama, to put across
ndardanama, to be silent
nealatnerama, to swear
nenterama, to understand
nenterama, to become distinct
nergama, to like, to be fond of
nentilama, to make known
nekua, father, thumb
nenta, strange, indistinct
nga, thou
ngalbanga, fresh, recovered, healthy
ngetjina, then, as, against
ngera, like, similar
ngualkna, with many branches, hairy, dense
nguanga, tame, peaceful
ngambakala, a domestic, a native
ngamara, the native pheasant
nganja, ngaroa, } a well
ngapa, a crow
ngira, a spot
nguanga, peace
ngumba, a hill
ngurangura, evening, afternoon
ngula, cool, pleasant, healthy
nguinba, to-morrow
nguinbarbuna, the day after to-morrow
nguna? who?
ngunatera? which two?
ngunirbera? which?
ngamiuma, to unfold
ngankalilama, to knock at the door
ngalbanga nama, ngalbanga lama, } to move or stretch oneself
nganelilama, to move, to turn anything
ngama, to carry
ngabitjauma, to turn, to roll something
ngakilkiuma, to contradict
ngetjima, to fetch, to bring
ngetjalbuma, to fetch or bring back
ngima, ngirima, Dual, } to beget
ngulerama, to become cool or pleasant
ngulilama, to make cool, pleasant, or healthy
ngurbmalilama, to think, to suppose
nilkna, secretly
nilknamba, a thief

ninkarauma, to keep secret for himself
nilknalinama, to steal
ningalauma, to suffer
nimbatnama, to appoint, to decide
nintakanintilama, to separate, to divide
ninkierama, to become contented
ninterama, to meet
ninkea, contented
ningalkua, afraid
nintangara, once, one time
ninta, one
nitia, / a young man or woman unmarried
nitaia, the menses
njaua, a crumb of bread, soft black clay
njora, a bush fire
njakerama, / to weep, to deplore
ntauerama, /
njerama, to fish
njalbutawama, to throw, to hit unintentionally or by chance
njarerguma, to make a knot
njarkuma, to forbid
njualilalama, to justify himself
njuma, to drink
njualelama, to justify
njualelanama, to overtake (running)
nkanja, the point, dinner-time
nkanjarinja, a widower
nkala, rain-clouds
nkanjunta, a shower of rain
nkarba, others
nkuabera, corroborree of women
nkarknerama, to astonish
nkaualama, to ask for leave
nkarpauma, to turn anything round
nkelalanama, to offer for exchange
nkererilama, to undermine (water)
nkolanama, to give only good things
nkulbinkurilama, to get quite contented
nkenkalalbuma, to read
nkeabuna, a gift, a present
nkirkna, an angry one
nkarkna, excited
nkanjabuna, unmarried, single
nkarakara, not there
nkurkuturkuta, altogether, all of us
noa, husband, wife
noaitilja, / a married couple
noakatana, \
nonba, first
nota, the lap
nuarintjama, to stink
nunangerama, to thunder
nurknanarerama, to become stiring, to spoil
nulanulilama, to dash to pieces
nuralibama, to stop
numberama, / to stay away
nuatnama, /
numbilkera, forbearing, patient
nunkara, / this side
nunkarakwa, /
nura, quiet
numbaka right
nururka, the heel
murbma, resin
ntalbintalba, with many branches
ntanga, green bushes
ntalta, the rays of sun
ntaiuma, / to whore
nilkalindalama, /
ntankerama, to become healthy, recover
ntalterama, to become a manly
ntaringama, / to follow
ntama, /
ntanjalerama, to give only things
ntarbatarinama, to separate
ntarbatariralama, to separate himself
ntarauma, to swing
ntarbukama, to tear off, to split
ntanterama, to watch
ntankama, to call
ntainama, to spear
ntaterama, to become quiet after mourning
ntaramataraurama, to advise
ntatnama, / to have a belly-ache
ntaterama, /
ntalama, to accompany
ntangerama, / to dip in
ntangalama, /
ntankalelama, to save, to redeem
ntanka, healthy
ntatna, strong, powerful
ntakagata? how big?
ntaritja, calm (wind), quiet (wat
ntaginga? how many?
ntana? where?
ntananga? whence?
ntauna? whither?
ntoritja, ranges, steep
ntotnima, / to refuse eating,
ntotninama, / satisfied already
ntema, to give
nteelama, to light a fire
nteliuma, to flash, to lightning
ntitjalbuma, to give back, to retu

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ıama, to charm
ma, to blow (wind)
nama, to go, to draw away
uds)
alama, to go for good
ilama, to follow
ıtilama, to hit
ala ntema, to give away, to
e a present
ara nama, to turn away from
nother one
a, to be in discord
, } to warm himself
ıa, }
sweat
ra, whole
, distinctly (speaking)
a, away
a, not sappy, dry
ıgala, farther away
ıa, sad, sorry
, } other side
kwa, }
ntjirka, through
lama, to hit not, to miss
a, yellow
ıtura, bad, ugly (face), angry
ı, true
, steps on a ladder
, the hip
a split, crack
, to dance
ıma, to feed, to nourish
rauma, to announce
ıerama, to become sorry
ıturerama, to distort the face
ılilama, to confess
ınkama, } to speak the truth
lama, }
na, to growl
ıea, food

O

} false, untrue
ka, }
a, a lie, untruth
ıma, to lie
narina, a liar
ebilama, to deceive, to swindle
ngerama, } to deceive, to disap-
ngilama, } point
ngilalama, to deceive oneself

P

quick
a, quickly
ıill, stone, mount
a, to stop, to bar

palbaparama, to take away, to conquer, to subdue
putapalalama, to go incautiously or boldly
parempara, a bend of a creek

R

raba (suff.), without
raltutja, a clear distinct voice
ramalkura, all the same, alike
rambarknira, mad, furious, raging
raienkama, to breathe
railakaraila ntema, to give unequally
rakama, to take away
ralbarankama, to babble
ralibuma, to make heaps
rambarambatnanama, to wash away (water)
rangauma, to remit (punishment)
rantarkninkama, to sob, to hiccough
rauerilama, to separate himself
rauerama, to scatter
raualilama, to throw away, to sow
ratjilauma, to endeavour to do
rargua, the Pleiades (stars)
raga, the hand
rangiltja, accidental
ranjaranja, furious, wrathful, excited
raka, after
rarka, } bald, hairless
rirka, }
rata, short (speech)
rara, } easy, light
rukura, }
rarpa (suff.), self
renalama, to go thither
reknuma, to call
rerama, } to get angry
rilerama, }
relbukama, to pull away
rera, kangaroo
renta, about
reta, first, dumb
rilama, to let, to take care, to look about
rinjerama, to wish, to desire
rinjanama, to like
rinjerguma, to strangle
rinjulbmerama, to choke, to die by thirst
rinjalatnama, to send one away
riljinga, the twilight in the morning
rinja, the throat
rilera, tame, quiet, good
rilerarilera, harsh-, rough-voiced
rirtja, dry
rirtna, soft

rinjintjirka, thirsty
riralama, to walk quickly
rirama, to shine
rirtjerama, to get dry
ririralbuntama, to run away
rolta, very angry
roamba, temperate, sober
roka, quiet.
rorgama, rorginjama, } to make a noise
rokerama, to get quiet
rokilama, to make quiet
roralilama, to shake
rotna, the chin
rukutilama, to offer, to promise
rubululbulerama, to get dizzy
runtalkniuma, to shut, to forgive
rumerama, to appear
rumeritjalbuma, to appear again
rualima, to run (as water)
runkula, wise, accustomed
rula, wood
rurra, a room
rutjarutja, a large wooden tray

T

ta, tautara, I
taiinta, even, smooth
tamba, loose, shaking, perishable, fading
taltja, unripe, green, weak
talkina, fugitive
talambata, long (speech)
tana, there
tanja, long, tall
tarta, shallow, not deep
taringaringa, laughing, merry
taia, the moon
tagitja, a block of wood, the ribs
takera, the roots of plants and trees
talkua, a line, a sign
talua, the end
tantalinalina, a curtain
tangatanga, the cross bone
tailbelilama, to stumble
takalilama, to push on, to drive on
takalama, to tumble down through age
takerama, to be frightened sometimes
takiuma, to sow
takurindama, to lean against
talama, to shut out (water)
talakauma, to hear attentively
taluerama, taluilama, } to finish, to cease
talakerguma, to span, to tie round
taljilama, to reconciliate
taljawuma, to throw far away
tama, to crack with a whip
tambarkalama, to creep, to crawl
tanbilama, to offer for exchange
tangaparama, toaparama, } to encircle, to shu
tantama, to prick, to sew
tangutangilama, to change, mista or relieve
tangitjatalama, topagama, } to shut in, s round or encir
tangilama, to come before one
tangitjalama, to help, to assist
taraunjinama, to blow up or ma up a fire
taratnama, to hang down
tarama, to laugh
tapinba, alive
taritjerama, to get calm (wind)
tatama, to glow
tataka, red, evening-red
tata, a spark
taua, a bag
taturatura, hell
teuma, to scrape, or scratch off
teelintama, to make afraid
teelabuljabula nama, to honour
terirama, to become afraid
terilkalama, telaelalama, } to flee, to run awa
tekua, a rat
terilka, fright, fear
teelabuljabula, honour
terabalabalalama, to warn
telama, to show
tenama, to beget
tera, two
tentia, topata, } slanting
terba, pretty
tilirkilirka, all of us, at once
tinjauma, to inter, to bury
tmaiatuma, to ask, to consult
tmanjiratjalama, to haunt (ghost
tmatera, to get perplexed
tmapalalama, to swim
tjaba, worms, maggots
tjaia, a path
tjalbma, chips
tjalabalapa, the navel
tjalanka, resin
tjaka, the joint of bones
tjamalarelja, an honest one (tru worthy)
tjarita, a furrow, a deep track
tjata, a spear
tjata, a species of Hakea
tjatjera, companionship

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tjauarilja, the part of game given to the old men
tjakama, to kill, to throw fatally
tjanalilama, to lead or guide through
tjankala, at last
tjaka, loose, shaking
tjarunka, knowing, wise
tjarbinarinama, to make a heap
tjartjatuma, to correct, rectify or to confess
tjartjarinama, to pay a visit
tjartjagatilama, to agree with, to affirm
tjarinama, to draw, pull off, or pull
tjeba, a piece
tjebma, the ribs
tjekula, tjukukula, } Cycas-palms (Encephalartos MacDonnelli)
tjelia, a small wooden tray
tjebakama, to break in pieces
tjenjama, to appoint
tjenkama, to appear (the souls of the deceased)
tjerama, to roast
tjeberama, to get broken
tjerentama, to exchange
tjikai (interj.), ah ! see !
tjibatjiba, zealous, industrious
tjikara, full of cracks
tjinba, familiar, intimate
tjiltja, soft, tender
tjimara, a row or line
tjimaralama, to go in one line
tjiberama, to look under or down
tjinbalama, to wait for one
tjinbalilama, to make intimate
tjinankilama, to reconciliate
tjinatnama, to twist together
tjina, tjilera, } a friend, a mate
tjilera, white worsted
tjininga, property
tjintalbintaninja, full of abscesses
tjoa, meagre, poor, (also) boys
tjoerama, to get poor or meagre
tjontilama, to begin
tjontia, the beginning
tjora, the shin-bone
tjora, sunshine
tjoananga, twins
tjaiairima, to look out for the road
tjortjikama, to console, to comfort
tjubmara, } the nail of fingers and toes, the claws of birds
tjumala, for ever as a present
tjunama, to lift, to lift up
tjurirama, to look at
tjurkmanterama, to get strong again, to recover
tjuerama, to heal
tjurankama, to rush or roar (as water)
tjurka, figs
tjulka, limestone
tjununkara, a sacrifice
tjurungara, corroboree
tjuta, porcupine grass
tmata, false
tmaina, perplexed
tmara, a camp
tmariltja, a native, a domestic
tmarankanja, the camp of the men
tmarankinja, an abandoned camp
tmaratmara, beetles
tmaranja, a question
tmanjinga, tmora, } a stalk of grass
tmalabortja, the hip
tmulbura, the throat
tmura, dense, broad
tmurka, yesterday
tmurkarbuna, the day before yesterday
tnakuna, dirty
tnāgama, to part to divide
tnakama, to believe
tnama, to stand, stand up or get up
tnadangauma, to lift upon, to lift up
tnakalama, to rise in wrath
tnaritjerama, to be glad, to get merry
tnainama, to graze, to pasture, to watch
tnanbuma, to jump over, to jump
tnabuta nama, to be unchaste
tnabuta, rank, unchaste
tnatna, pitiful
tnara, the hind-part
tnainaninanina, a shepherd
tnalta, a path
tnadinga, stem of a tree
tnadinga, the lower part of anything
tnama, a pointed stick
tnanjama, to praise
tnanbutnanbulama, to jump (as a kangaroo)
tnauma, to drive away
tnauerama, to be discontented
tnakinjiuma, to part, to give each his part
tnaljama, to crush, to smash
tnanakatatuma, } to knock to pieces, to crush seeds
tnatangauma, to help or assist

tnerka, peaceable
tnerkarkerama, to dissuade
tnerenkama, to blame
tnenema, to hit fatally
tnetuanetnana, rheumatism
tnenka, a revenger
tnitimbuma, to be angry
tnitatalama, to curvet from joy or pain
tnitaumalanama, to counteract
tnilalama, to weep, to weep for
tninma, to weep
tninjarirama, to separate himself
tniritjerama, to hope
tnita, the belly
tnitjimba, voluntary
tnitemba, half full
tnoatnoa, rich
tnonta, pregnant with child
tnolba, intemperate
tnolkama, to get a fright
tnolkalilama, to cry for fright
tnoerama, tnoeranjama, to lift the hand in beating
tnoirama, to aim at, to take aim
tnummerama, to get faint by heat
tnumbarilama, to groan with pain
tnurinjilama, to foretell or predict
tnunta, a corner
tnuma, a cripple
tnuntintnunta, cornered, angular
topinba, alive
topinga, behind
toparinama, to put upon
topintjarinama, to skin, to cut off
torintama, to press on
topanama, tuakama, to bend down, to stoop
tonkama, to draw (water)
toperama, toperanjama, to turn round
topalealerama, to turn himself round
topangatopangilama, to fence
tolkinjalama, to walk about for nothing
toperanjalbuma, to come back
toparilama, to boast
tora, the land near creeks
topa, the back
topirka, the kidneys
topangatopa, a fence
tuedaguteda, far away from each other
tuatjatuatja, lazy, idle, slow
tutna, certain, true
tunka, short, thick
tuorala, the place of the ghost of enemies
tuatja, the claw, the steps cut the bark of trees in ord to climb up them
tuma, to beat
turuma, to frighten
turinjilama, to make short
tuedinama, to change, to take wrong one
tunama, to order, to command
tuailalama, to pay a visit
tungarilama, to announce, threaten
tuelagama, to break the neck
turatura, short, low
tupa or tuatja, a valley or gorge
tukara, tmataka, an ulcer or abscess
tuta, also, too, and

U

ulaialama, to disperse, to scatter
ulbara, the ears of cereals
ulbainja, a boomerang
ulbulbara, a sow-thistle
ulba, colour
ulbulbana, bats
ulbaia, creeks
ulbatja, ringneck parrot
ulbmara, a dust-storm
ulbarara nama, to hang up
ulburkninjatuma, to beat time (a corroboree)
ulbma, narrow
ulbutia, exhausted
ulbuta, dirty, old, perished, bad
ulbutilama, to make bad or dirty, damage
ulbuterama, to become bad or old
ulbelama, to dash in small pieces
ulbunjama, to pull off or out
uboljilama, to wither, to fade
uboljerama, fading, withering
ulerama, to hide away
ulelama, to increase
ultarbakabirka, coloured, g coloured
ultagulta, under water
ulta, hollow
ultargama, to break, to tear
ulta, the side, the front part
ultamba, honey
ultmunta, dust
ultunta, drops
ultmelama, to bring or drive gether
ultuma, to cover
ultundikima, to drop
umba, to blister, to gall

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ara, the rainbow
rep.), in, on, to, into
a, to send away or off
ma, to revoke, to leave
nkulilama, to damage, to in-

ltjerama, } to crumble, to
ltjilama, } moulder
tjainama, to smell bad, to
k
stinking
a clay-pan
na, bones
ta, bitter, bad tasting
r enta, almost
thou, you
nga, thy, your
, serious, earnest
ripe, cooked, roasted, well-
e
nka, bloodthirsty
la, sweet
ra, a valley
ra, a little whirl-wind
ltja, crumbs, small pieces
a, to endeavour, to strive for
re, firewood
ranba, fiery, like fire
ruba, a big whirl-wind
a messenger
an echo
, black, dark, blue
a, some
arbuna, some others
a, wise, learned, accustomed
ara, also, too
ama, to sprinkle
puma, to prepare
alawama, to flash, to lightning
ltjalama, } to tumble down through age, to crush
ama, to go through between
rs
na, to disappear
jaruralama, to go to and fro
jama, to kiss
untema, to teach
erama, to learn, to get accus-
ed
erama, to rot
rkerama, to destroy by fire
a, elder sister
pinjara, brothers and sisters
, sap, a liquid
, a murderer
, the James' Ranges
a, small magpie

urba, the backbone
urbina, seed-pods, a scar or mark
urumitja, wilderness, desert
uritjima, Mount Sonder
utnuma, to bite

W

wa, } yes, of course, certainly
wabala, }
wakuia, }
wantai, } certain
wataka, }
walbawalba, overheated
wara, only, without purpose
wantinja, sappy
watawara, slender, thin
wantama, to affirm
wabalilama, to assent, to consent
walama, to think, to suppose
wagama, to keep, to detain
wankama, to swell
wangerama, to grumble, to murmur
wanama, to blow (wind)
wanjalama, to lick
waritja, a hut
warka, a crumb of bread
wama, to throw
warentama, to borrow, to give for a time only
waratalama, to go in a line
watinjalama, to spot, to stain
watinjalilama, to stain himself
welgalilama, to bend
wedawedalama, to spy
wolanitjalbuma, to go to the assembly
wolatja, breasts of females
wola, a heap, a meeting or assembly
wolibuma, } to heap, to pile, to as-
wolilama, } semble
wolakama, to bark (as dogs)
wolakawalerama, to remember
wonjama, to suck out, to suck
wontama, to provide for
wonawonilama, to keep, to detain, to preserve
wotilberama, to prick up the ears (horses or dogs)
worinterama, to get strong again (after illness)
wolkna, a grave
wora, a boy
wóra, steam
wotna, wet, moist
woka, why
worinta, solid wood
wota, again, once more, more
wumbuma, to burn

wunierama, to perish by thirst
wunia, mosquitoes
wunja, wunjinga, } aunt
wumbia, warmth, heat
wurinja, wind

———o———

ADDENDA — terminations of time

nguntangunta, morning before sunrise
ngutnala, morning after sunrise
nkanjankanja, before noon
nkanja, noon
ngurangura, afternoon
alkneraka, evening
namaltalbutia, after sunset
lilika, now, directly
lata, now, to-day, soon
latakwaia, only for a little while
tmurka, yesterday
tmurkawaia, the day before yesterday
tumurkalkura, some days ago
imankatmurka, some time ago
imankakata, long time ago
imankaltjiranga mballa, from eternity
inguntawaia, the day after tomorrow
inguntalkura, in some days
ingunta anma, in a short time
ingunta arbarmaninja, in a long time
ingunta arbarbuka, in an uncertain time
etatjata, in eternity
rinba, long time ago
irolangala, a very long time
lata ngala, a short time
lata ntema, soon again

———o———

NAMES OF SNAKES INDIGENOUS IN CENTRAL AUSTRALIA.

NON-VENEMOUS. — Renina (carpet snake), knaringa, rata, inturkuna, latna, runburunga, ntadirka,

VENEMOUS.—Putamanina, ilumbalitnima, lalagalba, kelupa, kabaltaringa, ilbiralea, lalbalanana, elanjararantanina, erulangalanana, ntjurtja, baraloatjira.

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Contributions on the Fungal Flora of Australia.

By Professor Dr. F. Ludwig, of Greiz, Germany.

[Translated and communicated by J. G. O. Tepper, F.L.S.]

[Read December 2, 1890.]

I.—The Parasitic Fungi, classed as "Rusts" and "Smuts" (Uredineæ and Ustilagineæ).

The Rusts and Smuts belong to those moulds, which, on the one side, may be studied by the general public, but have special interest for the owner of a microscope on account of their diversity of forms; on the other side they enforce general recognition by infesting many flowering plants, notably those cultivated by farmers, gardeners, foresters, &c., which are sometimes not only seriously damaged by them, but wholly destroyed. The more complete knowledge of these moulds has led people in Europe to avoid much damage and loss in various instances. Thus the ordinary Corn Rust *(Puccinia graminis)* is decreasing since the Berberis-hedges are being removed from the neighbourhood of cornfields (upon these the Æcidium-generation is developed); plantations of conifers and fruit-trees remain both free from the attack of the rusts since they are being rigorously separated, because the *Gymnosporangium* species of the Coniferæ require the fruit-trees to complete upon them their Rœstelia-stage, and *vice versa*.

Another corn rust, *Puccinia rubigo-vera*, is also widely distributed in South Australia; its Æcidia develope upon Boraginaceous plants. It is therefore only necessary to discover the particular species in order to limit and prevent the spreading of the rust.

In this direction there are numerous other practical problems connecting themselves with this question, *which can only be solved with any certainty when the fungal flora of the respective country is approximately known.* This, as shown by the following List of known Australian Rusts and Smuts, is by no means yet the case. In this direction even the ordinary practical worker can render valuable assistance, also those scientific students who are actively engaged in other specialties could turn advantageously some of their attention to the fungi. In the interest of the elucidation of the fungus flora of South Australia, and of the later practical deductions that might be drawn from the results

thus obtained, the members of the Royal Society are urgen
requested to promote this work as much as lies in their pow
If desired I will readily undertake with my mycological frie
the identification of the collected material.

LIST OF AUSTRALIAN UREDINEÆ.

Of the Rust Fungi rather more than 1,200 species are knov
and in a small district of Germany, containing a few squa
miles, several hundred species are to be found. From the wh
of Australia only some thirty species, as enumerated here,
known.

For the sake of brevity, the three generations, Æcidium, Ure
and Teleutospores, are indicated respectively by the Rom
numerals I., II., III.

Uromyces vesiculosus, Wint.—On *Zygophyllum ammophilu*
II., III., Spencers' Gulf (Baron F. v. Mueller).

" **fusisporus**, Cke. et. Mass.—On *Acacia salici*
Melbourne (Baron F. v. Mueller), II., III.

" **digitatus**, Wint.—On *Acaia notabilis*, II., II
Gawler (J. G. O. Tepper).

" **Tepperianus**, Sacc.—On *Acacia salicina* and
myrtifolia, III., Mount Lofty (Tepper).

" **Microtidis**, Cke.—On *Microtis porrifolia*, III.,
S. Wales.

" **Limosellæ**, Ludw.—On *Limosella aquatica*, I., II
Kangaroo Island (Tepper).

Puccinia graminis, Pers. (Corn Rust).—On *Avena sativa*, I
III., Melbourne (Reader), I. (Æcidium), not
known from Australia, elsewhere on *Berberis* sp

" **rubigo-vera**, D. C. (Red Rust), (I.), II., III.
Europe the Æcidium of this rust, which is ve
injurious to cereals (Rye and Barley), also
velopes upon Borragineæ (*Anchusa*, &c.); fr
Australia only II. and III. are known as yet,
Poa annua (Melbourne, Reader), *Alopecu*
(Coromby, Victoria, together with *Sclerospo*
macrospora, Sacc.; Tepper), and wheat (all
colonies).

" **bullata** (Pers.), Schrœter.—On Umbelliferæ, I., I
III. In Europe also an enemy for cultivat
plants, such as Celery, &c.

" **Prenanthidis** (Pers.), Fuchel.

" **rimosa** (Lk.), Wint.—On *Isolepis nodosa*, near M
bourne (Reader).

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nia **Lagenophoræ**, Cke., I., II., III.—On *Lagenophora Billardieri*, at Omeo. The same plant is also attacked by a mildew fungus, viz., *Erysiphe (Dimerosporium) Ludwigianum*, Sacc. The Mount Lofty Ranges (Tepper).

Saccardoi, Ludw., I., III.—On *Goodenia geniculata* (Tepper). To it belongs, doubtlessly, *Æcidium Goodeniacearum*, Berk.; on *Selliera radicans* (Reader). On plants of this order was also found another fungus, *Synthytrium Succisæ* (Tepper).

aucta, Berk. et. Muell., I., III.—On *Lobelia anceps*, *L. pedunculata*, and *L. platycalyx*, Victoria.

Ludwigii, Tepper, II., III.—On *Rumex Brownii*, Coromby, Victoria (Tepper).

Malvacearum, Mont., III.—On different Malvaceous species (Reader, Tepper). This rust came first from Chili to Europe, and has been distributed over all continents, and everywhere injured the wild and cultivated mallows greatly, even eradicating them at some places.

Alyxiæ, Cke., III.—On *Alyxia buxifolia*, near Brighton, Victoria (Campbell).

Berkeleyana, De Toni, III.—On *Dichondra repens*.

midium **Barnardi**, Plow. et. Wint. (I.), II., III.—On *Rubus parvifolium*; Victoria (Barnard), S. Australia (Tepper).

" **Potentillæ** (Pers.), Wint., (I.), II., III.—On *Acæna Sanguisorbæ*, near Melbourne (Reader). The species of this genus, of which a number is known from all the other continents, occur only on Rosaceæ.

ipsora **Lini**, Pers. (Flax rust).—On *Linum marginale*, &c., near Melbourne (Reader), Murray River (Tepper).

Clematidis, Berk.—On *Clematis microphylla*; Melbourne (Reader).

notabilis, Ludw.—On *Acacia notabilis*; Roseworthy (Tepper). The Uredo spores of this rust, which deforms the phyllodia considerably, have been described and figured by me in the "Bot. Centralblatt," No. 27, 1890 (the cellular contents of the peduncle should be removed from the figure), and are distinguished by a very remarkable surface sculpture. They are covered

by reticulations resembling the cells of bees, withi which arise small rounded protuberances. The othe stages of this and the other Uredo, Rœstelia, an Æcidium kinds have to be discovered yet.

Uredo armillata, Ludw.—On *Juncus pallidus*, near Coromby Victoria (Tepper). It belongs to an unknown specie of *Puccinia*.

" **angiosperma,** Thuem. — On *Hakea* (Baron F. v Mueller).

" **Anguillariæ,** Cke.—On *Anguillaria dioica;* Uppe Macquarie River (Hamilton).

" **Rhagodiæ,** Cke. et. Mass.—On *Rhagodia Billardier* (Watt).

" **Spyridii,** Cke. et Mass.—On *Spyridium parvifolium* (Watt).

Rœstelia polita, Berk.—On *Muehlenbeckia Cunninghamii* an *Jacksonia scoparia*. Brisbane. Most probably belonging t some Gymnosporangium of some Cypress species.

Æcidium Cymbonoti, Thuem.—Victoria.

" **Ranunculacearum,** D.C.—The Crow's-foot Æcidi belong to various kinds of rusts affectin Gramineæ.

List of Australian Ustilagineæ.

Our knowledge of the Australian Smuts is not much bette than that of the Rusts, for of about 400 known species o Ustilagineæ only the following 15 are known from Australia some of which also are unwelcome guests to the agriculturist:–

Ustilago segetum (Bulliard), Wint. The common black smut o the cereals. On *Avena sativa*; Melbourne (Reader On wheat, &c.

" **bromivora** (Tul.), Wint. On *Bromus mollis*; Me bourne (Reader).

" **solida,** Berk. On *Schœnus imberbis;* Melbourn (Reader).

" **utriculosa** (Nees), Winter. In the flowers o *Polygonum minus;* near Melbourne (Reader).

" **australis,** Cke. In the carpels of *Eriachne*, s (F. v. M.).

" **Mueilleriana,** Thuem. In the seeds of *Junc planifolius*; Victoria (Baron F. v. Mueller); Mour Lofty (Tepper).

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lago Fimbristylis, Berk. In the seeds of *Fimbristylis*; Melbourne.

" **marmorata,** Berk. On the leaves of *Isolepis prolifera.*

" **Tepperi,** Ludw. In the stem and floral parts of *Amphipogon strictus* and *Neurachne alopecuroides*; Torrens Gorge and Highbury Scrub (Tepper).

trastia axicola, Berk. In the grains and panicles of *Cyperus, Scirpus,* and *Fimbristylis.*

ssantia punctiformis, Wint. On *Lythrum hyssopifolium*

caphora globulifera, Berk. et Br. In the palea of *Leersia hexandra.*

osporium Muellerianum. In the panicles of *Cladium filum.*

" **Eriachnis,** Thuem. In the spikes of *Eriachne.*

ebella Paspali, Cke. et Mass. On *Paspalus scrobiculatus.*

II. Parasitic Enemies of Eucalyptus and Acacias.

mong the fungi collected by Mr. Tepper during the last few s the parasitic enemies of Eucalypts and Acacias are remark- numerous. They have been partly identified by me, partly Messrs. Winter and Saccardo at my request. They are the wing:—

A. *Enemies of Eucalypts.*

yporus Eucalyptorum, Fr.

tagona durissima, Berk. On *E. obliqua.*

ia mollusca, Fr. On *E. obliqua.*

obliqua, Fr.

ystictus cinnamomeus, Jacq.

lomyces incomptus, Sacc., *n. sp.* Conidia-form of a *Polyporus.*

pidotus haustellaris, Fr. On *E. viminalis.*

us lateritius, Sacc.

reum fasciatum, Schr.

" **cyathiforme,** var. *minor,* Sacc.

opodium australe, Berk. On *E. hemiphloia*; Victoria.

mphoria tenella, Sacc., *n. sp.* On *E. viminalis.*

iarosporium Eucalypti, Wint.

sarum album, Fr.

B. *Enemies of Acacia.*

Phyllosticta phyllodiorum, Sacc., *n. sp.*
Septoria phyllodiorum, Sacc., *n. sp.*
Uromyces digitatus, Wint.
" **(Pileolaria) Tepperianus,** Sacc.
Uredo notabilis, Ludw., *n. sp.*
Capnodium elongatum, Berk. et Cke.
Stereum hirsutum (W.), Fr.
" **Kalchbrenneri,** Sacc.

III. On the Position of Clathrus (Ileodictyon) Tepperianu *Ludw.*

Since I published the description of a species differing from forms of *Clathrus* hitherto known under the above name (B Centralblatt, Nov. 27, 1890), a larger work of one of the b authorities in respect of the Phalloideæ has appeared (" Unt suchungen zur vergleichenden Entwichlungsgeschichte u Systematik der Phalloideen," von Dr. E. Fischer, in Denkschrift d. Schw. Naturf. Gesellsch., vol. 32, part 1., 1890). In this wo the distinguished mycologist reduces several hitherto separa kinds into wider species. This he does also with the hithe distinct species of *Clathrus (Ileodictyon) cibarius* (Tul.), Fisch (with transversely ridged branches), and *Clathrus gracilis* (Berk Schlecht (branches delicate and smooth). With the union these two species the independence of *C. Tepperianus* would al cease, as the latter stands between the two former. It resembl *C. cibarius* in the dimensions and the breadth of the reticulati branches, and approaches the *C. gracilis* type by their smoothne but does not nearly reach the dimensions of some species in t London and Paris collections. From the standpoint of D Fischer the three hitherto recognised species, *C. cibarius*, *C. Te perianus*, and *C. gracilis*, would have to be united under the nar *C. cibarius* (Tul.), Ed. Fischer. Herr Fischer, however, writes me :—" To be quite sure in the union of these species, all t connecting links of the series should certainly be before me, least in the form of spirit specimens, and even then it would n be certain whether these different forms were individual variatio or constant varieties. Only observations in the respective loca ties or artificial cultivation can decide this point."

To initiate and encourage such observations and cultural e periments *in loco* has been the motive for the above remarks.

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Remarks on Photographing the Solar Eclipse of 12th December, 1890.

By D. B. Adamson.

[Read February 3, 1891]

I lay before you to-night some photo-negatives of the late solar eclipse, also a photographic enlargement of one of the same. The instrument used in taking them being a Newtonian reflector of 12½ in. aperture. Although with this instrument (when armed with the solar diagonal and dark glass) we can gaze on the sun's disc very comfortably, I found that a further reduction of the light would be required for the purpose of photography. Knowing that eclipses do not wait for any one, I set about making preparations and experiments a week before hand. My first attempt was with a diminished aperture and a very short exposure (one which might almost be termed instantaneous), using a common dry plate. On developing this I was somewhat surprised to find that on the centre of the plate (where a black disc should have been) there was only a circle of clear glass more transparent than the surrounding parts of the plate, the gelatine having quite disappeared from the exposed part. My next idea was to remove the silver from the face of the small speculum (having spare ones), and to place behind this a piece of black woollen cloth, in hopes of reducing, if not altogether getting rid of, the double reflection. I found that this gave a very cool reflection, but still so distinctly double that it was of no use for my purpose, so I replaced the small silvered speculum. I next removed the silver from the large speculum (having a duplicate of same), leaving only the bare glass to give the reflection, and by reducing the aperture of the telescope to seven inches, I succeeded in producing the photos as you see them. Although the slowest dry plates were used, and the exposure was almost instantaneous (being the time occupied by a one and three-quarter inch hole in a slide falling past a similar hole at the focus of the telescope), still it was too long, but by using a very weak developer the photos came out fairly sharp. My plan of procedure was in the first place to watch for the first contact, which took place at 11 h. 21 m. 3 s. a.m. This was very sharp and clear, the atmosphere being fairly steady. I next gave my attention to photographing, taking five negatives at various stages of the eclipse, my desire being to obtain one as nearly central as possible. This,

I thought, would be a permanent and measurable record of th quantity of the eclipse for future reference. Having obtaine the negatives, the next thing was to watch for the final contac Not only was the sun's image less steady at this period, but al an alarm of fire somewhat disturbed the observation, so that was not so certain as the first, still I do not think it can be mo than two seconds out. The final contact took place at 1 h. 54 m 30 s. p.m. By these times of first and final contact I find tha the second photo I took at 12 h. 36 m. 4 s. was 1 m. 42·5 earlier than the centre of the eclipse, but the nearest theret From this I have made a photographic enlargement, six and half inches in diameter. By applying the accompanying scale hundredths to this photo, we see at once that the encroachmen or overlapping measures 40·5 hundredths. Allowing for th photo not being exactly central, a very small amount should, course, be added. Being so near the centre of the eclipse, th advance made would be very small (not more than half one the divisions of the scale), so that the whole amount of the ob scuration may fairly be set down as 41 hundredths of the sun diameter. As proof of this, it may be added that the thir negative, taken at 12 h. 40 m. (being 2 m. 13·5 s. later than th centre of the eclipse), measures just perceptably less than th former. It may be stated as a proof of the absence of anythin in the way of distortion that the photos taken previous to th eclipse are perfectly circular. The enlargement is so sharp tha on close examination some of the protuberances on the moon limb can be readily distinguished.

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ESCRIPTION OF A NEW SPECIES OF COSSUS.

By J. G. O. TEPPER, F.L.S.

[Read February 3, 1891.]

Plate I.

sus Edwardsi, spec. nov. Female. Dark blackish grey. prominent, reflexed, underside white, upper black. Eyes with irregular black patches. Antennæ setaceous, nar- white above, remainder dark greyish brown; basal joint stout, as long as five or six of the next put together, the two ring about half the diameter of the first, rapidly tapering; nder very short, and very gradually tapering to a fine point ex. Face blackish, a patch of scales above the palpi, and air-like scales around the base of antennæ whitish. Pro- x dark blackish grey; in front a patch of long black scales, nixed with a few white ones. Mesothorax broadly bordered ont, and laterally by long white hairs, blackish behind. thorax blackish, broadly white laterally, narrowly behind. men dark blackish grey, with some very narrow paler bands , a broad pale stripe laterally, white when adjoining the brown, pale bordered, very glossy ventral plates, the last egments covered with dense white down underneath. Wings ish, margins and border grey, the latter with very devious boundary on the forewings. Forewings between subcostal nedian vein, with three roundish spots, rather large, the e one largest, and separated into two very unequal parts by k cuneiform line; a large round white spot in the middle of isk below the median vein; a small whitish spot between pical branches of the latter. Hindwings, the costa, and the overlapped by the forewings white, remainder dark brown- grey. Veins dark brown, much more curved than in *nereus*. Fringe very narrow, pale. Underside of thorax and covered with dense whitish down, the forewings clouded r and darker, most of the markings of the upper side visible ; subcostal and median veins bordered broadly by long n-white hairs for about two-thirds of the length; space be- anal vein silvery white; hindwings have the costa partly narrowly white, remainder ashy grey. Length of body, $2\frac{3}{4}$ s; span of wings, $6\frac{1}{3}$ inch.

e species differs from the common *Cossus cinereus* in much

darker colour, the characteristic and promiscuously spotted for
wings, and the different curvatures of the veins.

A single specimen was received through Mr. G. E. Edward
from Windsor, near Adelaide, on December 5, 1888, no oth
having been seen previously by me or other collectors, to whom
have shown it. Mr. Hy. Edwards, a noted Lepidopterologist
the United States America, who visited Adelaide last year, h
studied this and its allied family specially, and has lately writte
me that he cannot find anything at all resembling this speci
among described ones. It is hereby dedicated to him and th
finder conjointly.

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THER NOTES ON AUSTRALIAN COLEOPTERA, VITH DESCRIPTIONS OF NEW GENERA AND PECIES.

By the Rev. T. BLACKBURN, B.A.

[Read April 7, 1891.]

IX.

CARABIDÆ.

HYPHARPAX.

nei, sp. nov. Minus elongatus; viridi-æneus; antennis is apicem versus vix infuscatis), palpis, mandibulis (his si apiceque piceis), pedibus (femoribus leviter infuscatis), ytrorum margine tenui, et abdominis apice, testaceis; pro-orace fortiter transverso, postice quam antice vix latiori, stice utrinque foveolato, foveolis vix perspicue punctulatis, teribus modice rotundatis, angulis posticis obtusis vix tundatis, latitudine majori vix ante medium posita; ytris fortiter striatis, interstitiis subconvexis postice haud agis elevatis, 3° prope apicem puncto setifero instructo. is tarsis anterioribus 4 fortiter dilatatis, intermediorum ar-culo 1° subtus simplici; femoribus posticis subtus late ngulatis (vix dentatis); tibiis posticis leviter arcuatis. ong, 3 l.; lat. $1\frac{1}{10}$ l.

n the other species of *Hypharpax*, not greatly larger than present species may be known by the combination of the ng characters:—Legs entirely pallid (the femora only a rownish), elytra strongly striated (almost as strongly as in *ula*, Cast.); anterior 4 tarsi of male very strongly dilated as strongly as in *H. inornatus*, Germ.); posterior femora e only widely and obtusely angulated in place of the strong found in *H. inornatus*, *vilis*, &c.; posterior tibiæ of male rly and only slightly curved, not bent inwards strongly he apex. Perhaps the strong striation of the elytra is the ngle character. The prothorax is almost as in *H. inornatus*, as also are the hind tarsi.

Wales; taken near Mulwala by Mr. T. G. Sloane.

DICROCHILE.

ralis, sp. nov. Sat elongata; minus convexa; sat nitida nas) vel subopaca (femina); nigra vix æneascens; antennis lpis tarsisque plus minus picescentibus; prothorace quam

longiori vix tertia parte latiori, quam caput vix latio canaliculato, obscure transversim rugato, lateribus mir late reflexis ante medium subangulatis ante angulos posti sinuatis, his obtusis sat distinctis; elytris striatis, interstit sat planis (nihilominus 3° 5° 7° que apicem versus carina 3° mox ante apicem externe abrupte angulatim dilatato), punctis 2 vel 3 instructo.

Maris segmentis ventralibus 3-5 in medio sat crasse tra versim rugatis vel squamoso-punctulatis et setis palli obsitis. Long., 7 l.; lat., 3 l.

The sides of the prothorax very distinctly sinuate behind (a angular before) the middle, together with the peculiar sculptu of the elytral interstices posteriorly, render this a very distir species. The prothorax is scarcely more than half as wide as t elytra. The peculiar external angulation of the hind part of t third elytral interstice is best observed by looking along t elytra with the head of the insect directed towards the obser when it is very conspicuous. Compared with *D. Goryi*, Boi (apart from colour and the very different shape and proportio of the prothorax), this species has the prothorax obscur roughened with fine puncturation (where in *Goryi* it is strong rugulose), much less widely margined, &c.; the elytral interstic much less convex and very differently formed at the apex; a the ventral segments of the male much less nitid and having the middle part sculptured and setiferous (in *Goryi* there is irregular line of setiferous rugulosities on either side of t middle line). Of other previously described species *gigas*, Cas *punctipennis*, Cast., and *quadricollis*, Cast., are *inter alia* mu larger, *punctato-striata*, Cast., has elytral striæ strongly puncture *montana*, Cast., has the prothorax "short and transvers *minuta*, Cast., is much smaller than the present species, a *brevicollis*, Chaud., has the prothorax even more transverse th *D. Goryi*.

S.A.; near Port Lincoln.

HYDROPHILIDÆ.

PARACYMUS.

P. nigerrimus, sp. nov. Breviter ovalis; convexus; nitidu niger, nullo modo metallescens; antennis (clava except prothoracis lateribus pedibus elytrorumque apice rufescen bus; corpore supra sublævi-elytris sub lente forti vix p spicue punctulatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{3}{5}$ l.

The complete absence of sculpture—except the sutural stria the elytra which is obsolete in front—will distinguish this speci from all its known allies. Unfortunately, I have not been ab

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e a specimen for dissection, without which it is impossible
ure of all the structural characters, but I think there is no
of its being closely allied to *Paracymus (Paranacœna)*
Blackb., and *sublineatus*, Blackb., of which it has quite
ies, and the structural characters so far as I have been
examine them.
ntains of Victoria.

LACCOBIUS.

following species may, I think, be attributed to this genus
eviously recorded as Australian so far as I know), although
ffer from the European members of it in having maxillary
omewhat more robust, the labrum shorter, the mesosternum
ulated (not sharply carinated) in front of the middle coxæ,
e tibiæ set with short stiff erect bristles. In general ap-
ce, sculpture, &c., they resemble the European *L. minutus*,
but are a little more elongate in form. The distinctive
ters mentioned above might justify a new generic name,
m satisfied that for the present it is better to minimise
, and so should be disposed to attribute to *Laccobius* all
belonging to *Hydrobiides* (Lacordaire), and having eight-
antennæ, tibiæ devoid of swimming-hairs, prothorax and
segments of the *Hydrobius*-type, and facies style of sculp-
&c., resembling the European *Laccobii*. *Hydatotrephis*
inter alia in having the last joint of the maxillary palpi
nger than the penultimate, but in some characters comes
accobius.

tanus, sp. nov. Sat late ovalis; sat nitidus; brunneo-
ceus; antennis (clava excepta), palpis (apice summo ex-
pto), clypeo, prothorace, pedibusque dilutioribus vel tes-
ceis; supra crebre æqualiter sat aspere punctulatus; elytris
viter striatis; prothorace fortiter transverso, antice fortiter
marginato, lateribus sub-diaphanis, angulis omnibus rotun-
atis. Long., $1\frac{3}{4}$ l.; lat., $\frac{4}{5}$ l.

texture of the lateral portions of the prothorax is so thin
hese parts are transparent; the prothorax is very much
across the base than in front (though the hind angles are
irely rounded off that there is no clear distinction between
les and the base; the sides and apex of the elytra are paler
ur than the disc. Compared with the European *L. minutus*,
this species is throughout much more closely and evenly
ured, the puncturation being moreover scarcely so strong as
n the prothorax of *L. minutus*.
torian mountains.

tralis, sp. nov. Præcedenti affinis; differt statura minore,
rothorace in medio infuscato, hoc et capite multo sparsius

nec aspere punctulatis, elytris magis perspicue striatis, st
quam interstitia magis fortiter punctulatis. Long., 1¼
lat., $\frac{7}{10}$ l.

I have no doubt this is a good species, although very close
the preceding. In *L. montanus* the puncturation of the wh
upper surface is very equal and quite asperate, being so eve
distributed on the elytra as to include the punctures of the st
and make these latter quite confused with those of the intersti
In the present species the puncturation of the head and
thorax (especially the latter) is much finer and less close t
that of the elytra, while on the elytra the puncturation of
striæ is quite noticeably distinct from that of the general surf
Victoria; Ovens River.

CERCYON.

C. flavipes, Fab. I have recently taken this species (at
rate, I cannot find any character to justify regarding it as
tinct) at an elevation of about 5,000 feet above the sea, on
Victorian Mountains.

PAUSSIDÆ.

PAUSSUS.

P. australis. Sat angustus; sat opacus; obscure rugulose (p
sertim in elytris) punctulatus; ferrugineo-rufus; elytris fa
lata nigra ornatis; antennarum articulo 1° elongato-p
formi, 2° quam 1^us^ duplo longiori et duplo latiori diffo
(ad basin truncato, ad apicem rotundato, supra in parte ba
concavo in parte apicali fortiter convexo); prothorace
medio valde strangulato, parte antica fortiter transv
postice bifida, parte postica minus fortiter transversa su
profunde late longitudinaliter sulcata. Long., 2 l.; lat.,

The dark fascia on the elytra is at its widest near the lat
margin which it does not quite reach; thence it narrows a li
towards the suture, where its width is nearly half the length
the whole suture, its hind extremity being distant from the a
about a fifth of the length of the whole suture. This specie
interesting as being the first genuine *Paussus* recorded f
Australia.

Queensland; Mt. Bartle Frere; presented to me by C. Fre
Esq.

STAPHYLINIDÆ.

TACHINUS.

T. noritius, sp. nov. Sat nitidus; ferrugineus; antennis (api
versus) elytris (parte postica præsertim) meso- et meta-ste
abdomineque infuscatis; elytris prothorace fere duplo
gioribus; capite prothoraceque lævibus; elytris sparsim
subtiliter, abdomine crebre minus subtiliter, punctul
Long., 2$\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l.

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ne male the anterior tarsi are rather strongly dilated, on
per surface the apical segment of the hind body ends in
arp teeth, and on the under surface the penultimate seg-
of the hind body is sinuous or feebly emarginate in the
and the apical segment is very deeply incised (the middle
incision being convex hindward), both these segments
a conspicuous pencil of long ciliæ on either side.
sitate a little as to whether this species should be referred
inus or *Tachinoderus*. The principal distinctions between
o (I know *Tachinoderus* only by description) appears to be
e latter has the mesosternum carinate and the hind body
ed only at the base, while the mesosternum of the former
le and the entire hind body strongly margined. In the
insect the mesosternum is not quite so evenly rounded as
European *Tachini*, but certainly cannot be called carinate,
e hind body has an entire margin, but it is very much nar-
than in the European *Tachini*. The mouth organs seem
e in all respects with those of *Tachinus*; these, however,
cribed as being similar in *Tachinoderus* also.
rder to compare this species with some well-known one, I
beside a specimen of the European *T. marginellus*, Fab.
Mr. Olliffe reports from Sydney; probably introduced),
d that besides the structural distinctions mentioned above,
rs in its elytra being somewhat longer in proportion, its
rax and head almost lævigate (under a high power some
very fine puncturation can be detected), its elytra with
ration much more sparse and feebly impressed with a longi-
depression on either side of the suture, making the latter
carinate, and with the apex evidently more rounded, and
acturation of its hind body decidedly stronger with a more
longitudinal arrangement giving the appearance somewhat
itudinal wrinkles.
ntains of Victoria; a single example imbedded in snow.

HETEROTHOPS.

urus, Blackb. I find that I was in error in referring this
to *Heterothops*. An examination of its prothoracic stig-
as satisfied me that it is a *Quedius*, and should stand near
idus, Er. The short acutely-pointed apical joint of the
ary palpi misled me, but now, knowing the species to be a
s, I can see that even those organs are not really inconsis-
From *Q. hybridus* it may be distinguished *inter alia* by its
æ entirely red.

QUEDIUS.

rinus, Fauv. (var.? *Baldiensis*). Sat dense subtiliter
lvo-pubescens; piceus; antennis basi et apice, ore, pedi-

busque testaceis: elytris subæneis, basi suturaque obscu
testaceis; abdomine subirideo, apice cupreo-testaceo;
tennis sat robustis, articulis nullis transversis; cap
elongato angusto subparallelo, oculis parvis vix convex
prothorace quam longiori vix latiori, antice fortiter ang
tato, angulis posticis cum basi omnino rotundatis, punctu
usitatis notatis; scutello elytrisque (his prothorace
longioribus) leviter squamose sat crebre, abdomine spars
crassius, punctulatis. Long., $2\frac{1}{8}$ l.; lat., $\frac{3}{5}$ l. (vix).

In M. Fauvel's tabulation of the Australian *Quedii* (Ann. M
Gen., 1877, p. 268) the present species would fall under "
(along with *Q. æneus* and *cuprinus*) on account of the narr
elongate form of its head. It is much smaller than either
those species, and *inter alia* differs also from the former of the
by the sparse puncturation of its hind body, and from the lat
by the testaceous apical joints of its antennæ and the rounded-
hind angles of its prothorax. It is to be noted that the api
joint of the maxillary palpi in this species is slender, very acu
at the apex, and much longer than the penultimate joint.
spite of these differences, however, it seems to me not improbal
that this is a small Alpine var. of *Q. cuprinus*, and I have giv
expression to this opinion by recording it as above.

Mountains of Victoria; a single example in moss at an ele
tion of about 5,000 feet above the sea.

HYPEROMMA.

During a recent visit to the Victorian Alps I was fortunate
securing two examples (male and female), which evidently belo
to this remarkable genus (previously known only, I believe, by
unique male example from King George's Sound), and whi
M. Fauvel describes as sharing with only two other genera
Staphylinidæ the singular character of having the eyes placed
the upper surface of the head. I cannot doubt that these t
examples are identical specifically, although the differences (
sexual, I believe) are considerable, and I am not absolutely c
tain that they were taken in company. The species seems to
extremely close to the typical one (*H. lacertinum*, Fvl.), but t
sexual characters of the male forbid its being regarded as identi
unless on the supposition that M. Fauvel was mistaken as to t
sex of the specimen he described. This, however, appears to
sufficiently probable to render it inexpedient to give a distinct
name to the species before me, and I shall therefore offer t
following as probably merely a correction of the sexual charact
assigned to M. Fauvel's species. I cannot find any tangi
specific character in which the insects before me do not satisf
torily agree with the very full and clearly-expressed descript

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. lacertinum, although the *colour* is not quite identical. auvel says (Ann. Mus. Gen., 1878, p. 68), "obscure rubrum, nine piceo." In one of my examples the head is nearly , while the prothorax and elytra are reddish ; in the other ead and elytra are red, while the prothorax is nearly black; do not attach any importance to these differences.

certinum, Fauv.? Mas. Capite latiori; tarsis anticis *L* ortiter dilatatis; segmento ventrali apicali profunde triangu- ariter anguste inciso, penultimo in medio profunde sub- otundatim foveato; supra segmentis 2-4 in medio longi- udinaliter leviter canaliculato, segmento apicali postice sat ngustato.

nina. Capite minus lato ; tarsis anticis vix dilatatis ; seg- nento ventrali apicali postice sat angustato fere ut maris nciso, penultimo simplici ; supra segmentis haud canalicu- atis, segmento apicali postice sat lato.

LATHROBIUM.

ctoriense, sp. nov. Depressum; sat robustum ; sat nitidum; parce pilosum ; piceo-rufum; abdomine (apice excepto) ob- curiori, antennis palpis elytris pedibusque testaceis; capite basi antrorsum angustato, quam prothorax haud latiori, at fortiter sat sparsim (postice et latera versus magis crebre) unctulato ; prothorace quam latiori parum longiori, postice aud angustato, utrinque sat fortiter minus crebre punctu- ato, angulis omnibus sat rotundatis, lateribus subconcavis ; lytris prothorace sat latioribus, tertia parte longioribus, viter obscure punctulato-striatis ; abdomine crebre subtilis- ime (apicem versus minus crebre) punctulato ; antennis longatis. Long., $2\frac{3}{5}$ l. ; lat., $\frac{1}{2}$ l.

s species is no doubt near *L. gratellum*, Fvl., described on ue male from Sydney. Even if the insect before me should to be the female of that species, it is sufficiently remark- n colour to be regarded as an Alpine form deserving a ; it is not likely, however, that such is the case, for, apart colour, it differs in the head being narrower as compared he prothorax, and triangular rather than quadrate ; in the rax not being narrowed hindward (except, of course, close base, where the sides round off into the base), and I should in the stronger puncturation of the prothorax, which in *um* seems to be finer than that of the head ; whereas in the le before me the puncturation of the head and prothorax to be very similar in character. I hardly know where to the present species in M. Fauvel's tabulation of the Aus- n *Lathrobia* (Ann. Mus. Gen., 1877 and 1878), as its tarsal ure would associate it with the group called "I.," while all

the species with the head at its widest close to the base fall in the group called "II."

Mountains of Victoria.

PÆDERUS.

P. Meyricki, spec. nov. Apterus; nullo modo parallelus; niger; prothorace rufo, elytris cyaneis; oculis parvis; elytris basin versus angustatis, prothorace haud longioribus; abdomine retrorsum sat dilatato; cætera fere ut *P. cruenticollis*, Germ. Long., $3\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

The insect is at its widest across the hind body. The smallness of the eyes will at once separate it from the various forms of *P. cruenticollis*; the difference of size may be stated thus—in *cruenticollis* the hindmost point of the eye is about equidistant between the front of the same and the point where the lateral margin (or base) of the head is in contact with the neck, while in the present species the hindmost point of the eye is very distinctly nearer to the same than to the neck. I am a little doubtful whether this may not be the apterous insect which M. Fauvel (Ann. Mus. Gen., 1878, p. 516) mentions as a var. of *cruenticollis*, but if so I think that learned entomologist must have overlooked the difference in the size of the eye.

W. Australia; taken in 1886 by Mr. Meyrick.

P. cruenticollis, Germ. In November last year I found this species in countless thousands crawling over the snow on some of the highest peaks of the Australian Alps.

LITHOCHARIS.

L. varicornis, sp. nov. Sat robusta; parallela; pilis erecti sparsim vestita; minus nitida; picea, elytrorum sutura rufescenti, antennarum basi et apice prothorace abdominis apice pedibusque rufis; crebre subtilissime punctulata; elytris prothorace vix longioribus. Long., $1\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l.

Not unlike the European *L. brunnea*, Er., in build, but with very much finer and closer puncturation and somewhat longer elytra; the head is shorter than in that species, being a little shorter than the prothorax. Joints 3—7 of the antennæ are nearly black. The short series before me appears to be of one sex only—female.

Victorian Alps; among dead leaves.

SCOPÆUS.

S. ruficollis, Fvl. This is really an undescribed species, as its author merely points out in what respects it differs from the European *S. Erichsoni*, Kolen. I have a *Scopæus* from the Alpine district of Victoria which may be it, or may not—the latter is more probable, since Queensland is said to be the habita

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. ruficollis; but it is impossible to be certain on the point. description, however, is so deplorably useless that I think ething will be gained by this Victorian form being described, at the risk of its proving, sooner or later, to be identical the Queensland one; I am unable to specify any very pre- difference between the two forms, except that the specimen re me is a little smaller than *S. ruficollis* is stated to be, and the elytra do not seem to be "shorter than those of *richsoni*," which (according to Dr. Kraatz) are "not quite a l longer than the prothorax." I do not possess a type of *richsoni*, the habitat of which is thus stated by Dr. Kraatz, ccurs) rarely in Central and Southern Germany." Some ed forms occurring in France and Italy are recorded by Dr. atz as varieties of *Erichsoni*.

ubius, sp. nov. Subnitidus; minus depressus; pube sub- tilissima vestitus; piceus, antennis [illegible] prothorace [illegible] abdominis apice elytrisque obscure rufis, [illegible] (his apicem versus dilutioribus), pedibus testaceis; [illegible]utaceus, vix manifeste punctulatus; capite quadrato, [illegible], prothorace latiori; hoc oblongo, basi mani- feste biimpresso, supra linea mediana obsoleta sat nitida instructo; elytris prothorace latioribus, tertia parte lon- gioribus. Long., $1\frac{3}{5}$ l.; lat., $\frac{3}{10}$ l.

at par[illegible]t of the head which would be cut off behind a straight passing across the front of the eyes is as nearly as possible exact square—though with the angles of the said square ded. None of the joints of the antennæ are transverse. esid es *S. ruficollis*, Fvl., *S. digitalis*, Fvl. and *latebricola*, kb have been described from Australia; of these the former ble ickish or piceous tibiæ, and the latter is a smaller and less insect with a longer head, &c.

curipennis, sp. nov. Minus nitidus; minus depressus; pube at subtili vestitus; piceus, antennis palpis prothorace ab- dominis apice elytrorum apice pedibusque plus minus rufis vel rufescentibus; crebre subtilissime fere asperatim punc- tulatus; capite sat quadrato, quam prothorax parum latiori; hoc oblongo, basi subfortiter biimpresso, inter impressiones fere carinato, linea mediana elevata haud lævi vix manifeste notato; elytris prothorace parum latioribus, hoc nullo modo longioribus. Long., $1\frac{3}{5}$ l.; lat., $\frac{3}{10}$ l. (vix).

ery distinct from the preceding, on account of its much ter elytra and decidedly more defined puncturation; the an- æ and tarsi, moreover, seem to be a little stouter, and the ral appearance is duller and more obscure. The colours vary le, the lighter parts in some examples being more decidedly than in other examples; in some the elytra are of a nearly

uniform dark-brown tint, while in others they have a wider and rather conspicuous dark-red hind border; the distinctness of the red margin of the elytra usually seems to vary according to the light in which the specimen is held. The legs are of a pale-brown colour (very different from the decided testaceous tone of the same in *S. dubius*), the femora sometimes more or less infuscate. In the male the third ventral segment is a little flattened in the middle of its hinder part, the fourth bears a semicircular fovea, the fifth is widely and shallowly concave in its whole length, and the sixth is widely and sinuately emarginate behind.

The present species would seem to differ from *S. ruficollis*, Fvl. in having shorter elytra, and probably in various other characters. From *S. digitalis*, Fvl., it appears to differ *inter alia* by its tibiæ being of uniformly light colour. *S. latebricola*, Blackb., is a smaller and narrower insect* with longer elytra.

Victoria [illegible] strong, among dead leaves.

[illegible] near Wandin[illegible]me than [illegible]

DOMENE. [illegible]ferring the following

I am perhaps running some risk in [illegible]el's diagnosis of species to this genus, as I have not seen M. Fauv[illegible] author's tabu its characters,—but from its place in that learned [illegible]eferences t lation of the Australian *Pæderid* genera and from [illegible]esemblanc *Domene* in other memoirs, as well as from the close r[illegible]l, I thin of this insect to *D. Australiæ* as described by M. Fauve[illegible]s know I am not far wrong; at any rate there is no other genu[illegible]eferred as Australian to which the present species can be [illegible]examin Having only a single specimen, I have been unable to e[illegible]harac its mouth organs fully; but the following are its principal [illegible] see ters (some of which may be sexual) as far as they can be [illegible]bin without dissection:—antennæ short, stout, of the *Lathro*[illegible]mor type; head and prothorax almost as in *Scopæus*: anterior fe[illegible]oot armed with a distinct (though not strongly developed) t[illegible]an beneath; front tibiæ with their upper portion compressed [illegible]io dilated beneath into a large obtuse tooth, the lower por[illegible]th slender; anterior tarsi not dilated; posterior rather short, [illegible] basal two joints equal or nearly so, the third a little shorter, [illegible] fifth shorter than the preceding four together.

The shape of the front tibiæ is very peculiar, and I should hes tate much (on account of this character not being mentioned i M. Fauvel's tabulation) to refer the specimen before me to *Dome* were it not for a note in Dr. Sharp's memoirs on New Zealan

* The measurement of this species, as of others described in the sam memoir (Trans. Roy. Soc., S.A., 1887) was unfortunately taken with millimetre measure which I afterwards discovered to be slightly inaccurat or rather not in accordance with the theory of a millimetre equalling half line. The length of *S. latebricola* is 1¼ l.

ptera, in which he distinguishes a genus of *Pœderidæ* from *ene inter alia* by its front tibiæ being "almost simple."
e genus *Domene* is characterised in M. Fauvel's Fn. Gall.-., vol. iii., p. 305,—a work to which I do not know how to re access.

) *Torrensensis*, sp. nov. Tota pallide ferruginea; pedibus paullo dilutioribus; capite prothoraceque confertim subtilissime (illo subaspere), elytris vix minus confertim minus subtiliter, abdomine fere ut caput, punctulatis; prothorace linea mediana longitudinali tenui notato, hac postice sat manifeste elevata antice subobsoleta; elytris prothorace paullo longioribus. Long., $2\frac{1}{3}$ l.; lat., $\frac{1}{3}$ l. (vix).
e head and prothorax bear a system of very faintly impressed very inconspicuous punctures larger than and additional to ystem of very fine close puncturation mentioned above. ntennæ (set back) would reach quite to (but scarcely beyond) ase of the prothorax. The head and elytra are of about width, the prothorax being narrower.
is species seems to differ from *D. Australiæ*, Fvl., *inter alia* ing smaller with the elytra longer (in *D. Australiæ* these are to be scarcely so long as the prothorax,—in the present they are distinctly longer). M. Fauvel's description of pecies unfortunately consists largely of comparison with a pean *Domene* to which I cannot refer, but should judge that ad is less closely punctulate than that of *D. Torrensensis*, says that it is "much more sparsely punctured" than that *stilicina*, whereas the head in the present species is punc- about as closely as it well could be.
uth Australia; in debris of the Torrens River.

PALAMINUS.

net with a single example last November (in the Victorian e district) of this genus represented in the Australian ibed fauna by a single species (*P. Australiæ*, Fvl.) described unique specimen from Queensland. As M. Fauvel's descrip- (so-called) is merely a brief comparison with a species from Guinea which probably is not in any Australian Museum, mpossible to say whether or not the insect before me is iden- ; I should judge, however, that it is very similar, but it rs to be a little smaller, and is probably distinct. One feels gly tempted to treat such worthless descriptions as non- ent.

BLEDIUS.

signicornis, sp. nov. Minus nitidus; antice pube fulva minus crebre vestitus, abdomine setis erectis instructo; niger; mandibulis (his elongatis) antennarum que basi plus

minus rufescentibus, pedibus (tibiis nonnullis exemplis apicem versus infuscatis) et elytrorum macula magna laterali testaceis; capite prothoraceque (hoc sat transverso, medio canaliculato, leviter minus crebre punctulato) alutaceis elytris prothorace sat longioribus, sat fortiter sat crebre punctulatis; abdomine subnitido subalutaceo, segmentis singulis apicem versus punctulatis.

Maris mandibulis supra in medio dente suberecto armatis tuberculis antennariis valde productis; antennis corporis dimidio longioribus.

Feminæ mandibulis inermibus; tuberculis antennariis parvis antennis brevioribus. Long., $1\frac{1}{8}$ l.; lat., $\frac{3}{8}$ l.

The antennal tubercles of the male are produced into elongate subcylindric processes, while in the same sex the basal joint of the antennæ is extraordinarily developed (being as long as the prothorax), and the antennæ set back would reach almost to the apex of the elytra. The general facies is entirely that of a typical *Bledius*. The large conspicuous testaceous spot on the elytra near the lateral margin is a very distinctive character.

Victoria; on the banks of the Ovens R.

B. Ovensensis, sp. nov. Sat nitidus (capite prothoraceque subopacis); pube argentea vestitus, abdomine setis erectis instructo; niger, mandibulis tibiis tarsisque rufescentibus capite prothoraceque (hoc minus transverso, lateribus pone medium sinuatim convergentibus) creberrime subtilissime punctulatis; elytris prothorace multo longioribus, crebre sat fortiter punctulatis; abdomine supra vix perspicue (subtus sparsius sat fortiter) punctulato; antennis brevibus.

Maris (?) prothorace haud canaliculato.

Feminæ (?) prothorace longitudinaliter subtiliter canaliculato Long., $1\frac{1}{2}$ l.; lat., $\frac{3}{10}$ l.

This species must be near *B. aterrimus*, Fvl., but seems to differ by its differently coloured legs and much longer elytra these latter are described as scarcely longer than the prothorax in *B. aterrimus*, whereas in the present species they are not much shorter than the head and prothorax together.

Victoria; on the banks of the Ovens R.

B. infans, sp. nov. Totus nitidus; pube argentea vestitus, abdomine setis erectis instructo; niger; mandibulis pedibus et nonnullis exemplis antennarum apice rufo-testaceis; capite prothoraceque (hoc minus transverso, lateribus pone medium sinuatim convergentibus, linea dorsali vix impressa) subtilissime lævigatis; elytris prothorace multo longioribus, crebre sat fortiter punctulatis; abdomine supra vix perspicue (subtus sparsim sat fortiter) punctulato; antennis brevibus. Long. 1 l. (vix).

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ingularly like the preceding in miniature; differing from it fly by its differently coloured legs and nitid sublævigate head prothorax. It is to be noted, however, that in some examples femora are more or less infuscate.
ictoria; on the banks of the Ovens R.

PSELAPHIDÆ.

CTENISTES.

Andersoni, sp. nov. Rufo-castaneus, elytris postice piceis; antennis minus brevibus; prothorace leviter tranverso lateribus evidenter calloso, impressione basali intermedia antice subfurcata; elytris prothorace dimidio longioribus. Long., 1 l.; lat., $\frac{2}{5}$ l.

he antennæ are elongate, reaching back beyond the middle of elytra; joints 1 and 2 short, slightly thicker than the follow- ones; 3-10 very slightly increasing in thickness. Of these, id 7 are longer than the others and equal to each other, 8 is shortest and is wider than long, 9 is scarcely longer than 8, scarcely longer than 9, 5 about equal to 4, 6 a little shorter n 7, 10 scarcely shorter than 7 [7 is quite twice as long as 8]; eleventh joint is as long as the preceding three together, and oderately dilated on one side from the base to beyond the dle, and then narrows again to the apex.
his species is evidently near *C. impressus*, Shp. (the largest tralian *ctenistes* previously described),* but is considerably er. The antennal joints are very differently proportioned, not in such fashion as to suggest difference of sex; and the ennæ are considerably longer I should judge (they certainly d not well be called "rather short," as those of *impressus* are). expression, "elytra distinctly longer than the thorax," ap- d to *C. impressus*, moreover, suggests shorter elytra than e of *C. Andersoni*, especially in view of *C. simplex*, Shp., being to have elytra half again as long as its prothorax, and to be inguished from *C. impressus* by its proportionally shorter pro- ax.
. Australia; taken by my friend, Mr. J. Anderson.

BRYAXIS.

Lindensis, sp. nov. Nitida; setis erectis sat crebre vestita; vix perspicue punctulata; piceo-nigra; pedibus piceis (tibiis antice et tarsis omnibus pallidioribus), antennarum articulis

C. impressus is stated by its author to be smaller than *C. vernalis*, g, but this seems to be a mistake, as the size given is 1½ mm. = $\frac{1}{18}$ inch, reas *C. vernalis*, King, is given as $\frac{3}{25}$ inch. The mistake no doubt arises Archdeacon King having in his original description of *C. vernalis* set n the size as $\frac{3}{25}$ inch, and afterwards (Tr. Ent. Soc., N.S.W., I., p. 102) ed that this was a mistake.

1-4 11 que rufo-testaceis ; capite elongato, inter antenna impresso, postice utrinque fovea magna instructo ; pr thorace brevi vix subcordato, basi utrinque foveolato, fovei linea transversa conjunctis ; elytris prothorace dimidi longioribus, stria suturali profunda altera discoidali (ha apicem versus abbreviata) instructis. Long., $1\frac{1}{5}$ l. (vix) lat., $\frac{3}{5}$ l.

The antennæ are stout and rather short (scarcely longer tha the head and prothorax together); joint 1 is scarcely so long a 2 and 3 together, 3 is much more slender than the rest, 5 and are stouter (5 scarcely larger than 6), 5-10 all transverse and nc much different *inter se*, but all a little triangularly dilated on th inner side (so that the antennæ seem subserrate), 11 subconic an nearly as long as the preceding two together, but not stouter.

I am doubtful of the sex of the example before me, as I fin no noticeable character in the ventral segments, while the an tennal structure seems rather of the male type.

I do not think any previously described Australian *Bryaxis* c large size is of a nearly uniform black colour.

S. Australia ; in seaweed near Port Lincoln.

B. Harti, sp. nov. Nitida ; minus angusta ; breviter pubescens subtiliter minus crebre punctulata ; ferruginea ; antenni apicem versus infuscatis ; his minus elongatis, apice gradatir sat fortiter dilatatis ; capite inter antennas impresso, inte oculos foveis 2 magnis profundis instructo ; prothorace sa transverso, sat crebre punctulato, trans basin 3-foveolat (fovea media vix perspicua), foveis linea sulciformi conjuncti elytris prothorace plus dimidio longioribus, antice minu angustato, striis suturali et discoidali fortiter impressis abdominis segmento 1° 2° paullo longiori, simplici. Long 1 l. (vix); lat., $\frac{2}{5}$ l.

Maris segmentis ventralibus in medio impressis, ultimo fovea subrotundatam (penultimo processum tuberculiformen ferenti ; tibiis intermediis intus fortiter emarginatis, super e infra partem emarginatam dentes acutos singulos ferentibus tibiis anticis intus spina minuta sat longe ante apicer armatis ; antennarum articulo 9° 10° vix minore.

Feminæ segmentis ventralibus tibiisque simplicibus ; anter narum articulo 9° 10° multo minore.

The central basal fovea of the prothorax (as in *B. Ovensensis* is scarcely more than a slight dilatation of the transverse furrov The antennæ are as long as the head and prothorax together joints 1 and 2 are stouter than the following joints ; 1 a goo deal longer than 2, 3 a little longer than 2 ; 4-7 scarcely so lon as 3, and differing little *inter se* except in 5 being a little th

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test; 8 shorter but not less stout (it is distinctly transverse); d 10 about equally wide, but 10 a little longer (9 transverse, carcely so) in the male [in the female 9 is about intermediate ize between 8 and 10, and 5 is not at all dilated]; 11 some- t oval, as long as 9 and 10 together, and in the middle wider n either.

his species does not seem very near to any other previously ribed. The discoidal stria of the elytra seems a little less ngly impressed in some specimens than others, but I think is an accidental variation.

outh Australia; I have taken it near Adelaide, and also find mong some Adelaide specimens taken by the late Mr. Hart. ccurs among vegetable debris on the banks of streams.

. hyalina, Schaufuss. Last November I found a *Bryaxis* in Alpine district of Victoria which agrees fairly well with the cription of this species so far as it goes, but it is impossible to sure, as the description is very defective—not mentioning the cturation of any part, and only casually alluding to the exist- e of any sculpture on the basal dorsal segment of the hind y. If the insect in question be distinct from *B. hyalina*, I uld judge that it is likely to be distinguished by the two que striæ which run hindward from the front of the basal sal segment of the hind body being more strongly divergent, by the puncturation being different; this on the head, pro- rax, and hind body is fine, somewhat sparse, and inconspicu- ; while on the elytra it is much coarser and closer, more so n is usual in (at least the Australian species of) the genus. m *B. flavipes*, Schauf. (another allied species), the long basal ment of its hind body will distinguish the present insect, which ms to agree with *B. flavipes* in having the striæ of the basal sal segment strongly divergent hindward.

inusitata, sp. nov. Nitida; sat brevis; sparsim ochraceo-hirsuta; ferruginea; antennis minus robustis; capite sat brevi, antice transversim 3-foveolato, postice utrinque fovea majori instructo; prothorace transverso lævi, postice foveis 3 (transversim positis nec linea conjunctis) instructis; elytris prothorace vix longioribus, transversis, perspicue punctulatis, humeris subtuberculiformibus, stria suturali profunde impressa discoidali subtilissima; abdominis segmento 1° quam 2^us^ 3^us^ que conjuncti sublongiori, basi fortiter transversim sulcato, utrinque juxta sulcum stria longitudinali instructo. Long., $\frac{3}{5}$ l.; lat., $\frac{3}{10}$ l. (vix).

The antennæ are about equal in length to the head and pro- rax together. The basal two joints are very similar *inter se*,

each being much stouter, but not much longer than joint 3; joints 3-8 scarcely differ in thickness, except that 5 is very slightly stouter than 4 and 6; 4, 6, 7, and 8 are about equal in length *inter se*, and are slightly shorter than 3 and 5, which also are about equal *inter se;* 9 is scarcely longer than 8, but is stouter; 10 is very little longer, but a good deal wider, being transverse; 11 is about the same length as the preceding two together, and is still stouter than 10.

This species appears to me to stand near *B. brevis*, Schauf., which M. Raffray has formed iuto a new genus or subgenus, under the name *Schaufussia*. Although it comes very near Herr Schaufuss' description of the species, it does not present the character in the palpi on which *Schaufussia* is founded, and it differs from Herr Schaufuss' description in having the prothorax lævigate. I think its small size, short elytra, prothorax with three unconnected basal foveæ and curiously sculptured basal segment of the hind body are characters that in combination will suffice for identification. I do not find any characters decidedly determining the sex of the two examples before me.

S. Australia; in moss near Port Lincoln.

B. Ovensensis, sp. nov. Nitida; angusta; sparsim hirsuta; ferruginea; capite abdomineque vix infuscatis; antennis elongatis sat gracilibus; capite elongato lævi, inter antennas inæquali inter oculos 3-foveolato, foveola intermedia parva; prothorace vix transverso vix cordato, trans basin 3-foveolato (fovea media minus perspicua), foveis linea forti sulciformi conjunctis; elytris prothorace dimidio longioribus sparsim obscure punctulatis, antice fortiter angustatis, striis suturali et discoidali profunde impressis, abdomine ut elytra obscure punctulato.

Maris abdominis segmentis ventralibus in medio planatis; tibiis posticis apice valde introrsum curvatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{2}{5}$ l.

The antennæ are distinctly longer than the head and prothorax together, and none of the joints are transverse; joints 1 and 2 are a little stouter than the following ones (1 a little stouter than and nearly twice as long as 2), 3-7 a little longer than 2 and subequal *inter se*, 9 very like 2 and slightly larger than 8, 10 about as long as 3, but much wider (almost transverse), 11 fully as long as 9 and 10 together, and evidently wider than 10; joints 1-7 (except, perhaps, 2) are all much longer than wide.

This species is very near *B. strigicollis*, Westw., structurally, but its facies is very different (form narrower and more elongate, antennæ longer and more slender, &c.). It seems to be also near *B. hortensis*, King, *lunatica*, King, and *electrica*,

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ıg. From the first and last of them its antennal structure ıishes a ready distinction. I should hesitate to separate it n *lunatica* were it not for the phrase, "thorace breviter obcor- ɔ," in the description of that insect, a phrase which could not ıightly applied to the present insect, the prothorax of which carcely, if at all, wider than long. In the figure of the magni- antenna of *B. lunatica*, moreover, the second joint is repre- ɛd as longer than the third, which is not the case in *Ovensensis*.

Victoria; in a marsh near the banks of the Ovens River, ɔng dead leaves.

paludis, sp. nov. Nitida; sat angusta; vix pubescens; vix perspicue punctulata; ferruginea, antennarum clava vix pallidiori; antennis minus elongatis, clava 2-articulata, hac valde dilatata et elongata; capite inter oculos minute bi- foveolato; prothorace æquali minus transverso, quam caput paullo longiori; elytris quam prothorax fere duplo longiori- bus, striis suturali sat distincta discoidali nulla.

Maris segmento basali ventrali antice creberrime aspere punc- tulato, postice obscure tuberculato, segmento apicali fovea rotunda impresso; tibiis intermediis intus in medio obtuse dentatis, posticis apicem versus dilatatis arcuatis.

Femina latet. Long., $\frac{1}{2}$ l.

The antennæ are scarcely so long as the head and prothorax ɛther; the club consists of two joints, and is not much shorter ı all the preceding joints together, and is very strongly di- d. Joints 1 and 2 are very stout and cylindric, 1 a little ger and stouter than 2; joints 3-9 stout and scarcely increasing hickness, 3 scarcely transverse, the following joints becoming e so; 10 is about three times as wide as 9, and is as long as preceding 3 joints together; 11 is of about the same width, nearly twice as long as 10.

. Australia; in debris on some marshy ground near Adelaide.

EUPINES.

This name was proposed by Archdeacon King for what he con- red a subgenus of *Bryaxis*. I am inclined to think it may ɔreated as a good genus. I have seen numerous species re- ble to it, and find that (besides the characters mentioned by author) they agree in exhibiting a uniform type of sexual ılliarity in the sculpture of the meta-sternum and second (the that is readily apparent) of the ventral segments of the hind- y. The following Australian species apparently attributable *Eupines*, have already been described (most of them as *ıaxis*), viz:—

æquata, King
affinis, Schauf.
ampliventris, Schauf.
aurora, Schauf.
capitata, King
clavatula, King
concolor, Shp.
exigua, King
diversicolor, Schauf.
geminata, King
globulifer, Schauf.
melanocephala, Schauf.
picta, Schauf.
polita, King
pumilio, Schauf.
spreta, Shp.
sobrina, Schauf.
sulcata, Shp.
transversa, King
Victoriæ, King
vitrea, Schauf.

The following are distinguished from the above species o *Eupines* (though Archdeacon King did not consider the distinc tion more than sectional) by having antennæ of only 10 joints :—

Elizabethæ, King
laticlava, Schauf.

I am doubtful whether the following are *Eupines* :—

atra, King
læviceps, Schauf.
talpa, Schauf.
plecta, Shp.

The species of *Eupines* have much resemblance *inter se* as re gards their superficial characters, but, so far as I can judge, ar very well characterised by the sexual peculiarities of the meta sternum and ventral segments. Unfortunately these are re corded in the description of the following only :—

concolor, Shp.
sulcata, Shp.
spreta, Shp.

There are sexual characters also in the antennæ and tibiæ c at least some species, which are more or less exactly recorded i the descriptions of many of the above-named.

The following species in my collection seem to be clearly di tinct from any previously described, although it is possible (a noted below) that the first may be an Alpine form of one of Her Schaufuss' species.

E. sororcula, sp. nov. Mas. Fere lævis ; picea, prothorace vi rufescenti, elytris sanguineis apice infuscatis, antennis palp pedibus segmentisque ventralibus apicalibus testaceis ; set erectis parce vestita ; capite inter oculos bifoveolato, int antennas vix biimpresso et transversim leviter elevato, anti declivi ; prothorace æquali, leviter transverso, vix subcordat elytris prothorace fere duplo longioribus, humeris callosi striis suturalibus distinctis ; antennis capiti prothoraciq conjunctis subæqualibus, tibiis posticis apicem versus levit dilatatis et sinuatis ; abdominis segmento dorsali 1° obliq bistriato, segmento ventrali 2° a basi ad apicem subtiliter medio carinato ; meta sterno postice fovea profunda minc instructo (hac in fundo longitudinaliter sulcata). Long., ½

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Of the antennæ, joints 1 and 2 are stouter than any of the following 6, and are together scarcely so long as joints 3-5 together; and 4 are equal *inter se*, each much shorter than 2; 5 is very idently but not very much longer and stouter than 4; 5-8 are ual *inter se*, and each a little smaller than 4; 9 is short and ansverse, about as wide as 1; 10 not much longer than, but arly twice as wide as, 9; 11 a little wider than, and about ice as long as, 10; none of the joints 1-8 are transverse.

Femina. A mare differt antennis (præsertim articulis intermediis) obscurioribus, longioribus, articulis aliter proportionatis; metasterno postice minus fortiter impresso, abdomine simplici.

Of the antennæ of the female, joints 3 and 4 and 6-8 are a tle more elongate; 5 is not much longer or stouter than 3; 9 d 10 are together about as long as 6-8, neither of them transrse, 10 longer and wider than 9; 11 is a little longer but arcely wider than 10.

The superficial characters of this species seem to be near those *Bryaxis vitrea*, Schauf., of which no sexual distinctions are corded by its author; the difference in colour is considerable, that this form is at least deserving of a varietal name, even it should eventually turn out to be a form of *vitrea*.

Victorian Alps.

nauta, sp. nov. Mas. Fere lævis; picea, prothorace vix rufescenti, elytris lateritiis, pedibus et antennis (articulis penultimis exceptis) rufis vel rufo-testaceis; glabra; capite prothoraceque æqualibus; hoc sat transverso vix subcordato; elytris prothorace plus dimidio longioribus, humeris vix callosis, striis suturalibus distinctis; antennis quam caput prothoraxque conjuncti vix longioribus; femoribus anticis subtus obtuse dentatis, tibiis anticis intus dente lato sat acuto armatis, femoribus ceteris dilatatis (posticis subtus fere subdentatis); metasterno late profunde excavato, parte excavata in medio obsolete longitudinaliter carinata; abdominis segmento ventrali 2° opaco creberrime aspere punctulato, fossa lata (hac apice carina elevata transversa terminata) per totam longitudinem impresso. Long., $\frac{3}{5}$ l.

Of the antennæ, joints 1-3 decrease successively in thickness, and 3 being almost equal to each other in length, 1 a little nger; joints 3-8 scarcely differ in thickness, except 5, which is arcely thicker than the rest; 4, 6, and 7 are equal *inter se*, each little shorter than 3 and 5, which are of equal length; 8 is a tle shorter than 7; 9 is almost globular, a little longer and outer than 8; 10 is a little longer than 9, and nearly twice as de, being pretty strongly transverse; 11 is very little wider

than 10, but is about twice as long; 10 is the only really transverse joint.

Femina. A mare differt antennarum articulo penultimo minus transverso; metasterno multo minus fortiter impresso; femoribus, tibiis, abdomineque simplicibus.

A marked character in this species is the strong contrast in respect of colour between the last two antennal joints; the almost complete absence of setæ, and also of foveæ on the head (two foveæ seem barely indicated in one or two examples), is also distinctive. The exposed portion of the hind body is strongly declivous.

The sexual characters in the antennæ are exceptionally slight, those in the legs, metasternum, and second (the first being scarcely visible) ventral segment are far stronger than in any other *Eupines* known to me.

S. Australia; near Port Lincoln, under the bark of a tree surrounded by flood waters.

E. nautoides, sp. nov. Mas. Ab *E. nauta* vix differt nisi tibiis anticis intus haud dentatis, metasterno postice minus excavato, abdominis segmento 2° simplici, elytrorum sutura postice carinata, retrorsum spiniformi producta. Long., $\frac{3}{5}$ l.

This insect, of which I possess two examples, is a very puzzling one, and I know not whether to regard it as an abnormal form of *E. nauta*, or as a distinct species; but its differences (such as they are) are so strongly marked that there seems to be certainly good reason for its having a distinctive name. I cannot even feel sure whether it is a male or a female, its ventral character being suggestive of the latter sex, while its dentate femora point very strongly to the former. On the whole I incline to think it the male of a good species of which I have not seen the female; the strong spine into which its elytra are produced at the sutural apex will at once distinguish it from all its described congeners. In the examples before me the legs are of much darker colour than in any *E. nauta* that I have seen, but this is quite likely to be accidental.

S. Australia; near Port Lincoln.

E. spiniventris, sp. nov. Mas. Ab *E. nauta* differt antennis sublongioribus; femoribus simplicibus; tibiis anticis posticisque (haud dentatis) paullo ante apicem intus emarginatis; metasterno multo magis late magis profunde excavato; abdominis segmento ventrali 2° sat nitido haud longitudinaliter impresso, postice tuberculum subconicum antrorsum directum, apice acutum formanti.

Femina latet.

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My example of this insect is certainly a male, and though very e to *E. nauta* its sexual characters are quite inconsistent with idea of specific identity. The emargination on the inner side the front tibiæ is quite noticeable, but occupies only a small t of the tibia; that of the hind tibia is much larger, nearly apical third part of the inner margin being very slightly con-e. The hind tibia is at its widest just above the emargina-, so that the dilatation at that point is capable of being arded as a feeble tooth. The metasternum is largely, deeply, almost circularly excavated; the corresponding excavation in *nauta* appearing as a wide longitudinal impression. The ercle on the second ventral segment is of peculiar shape, and icult to characterise intelligibly; the hind margin of the seg-nt seems to be gradually elevated from either side towards the dle (where it is quite spiniform), and also bent forward; so t if the insect be viewed from the side, an inclined plane end-in a sharp point seems to run upward and forward from the x of the second segment towards the metasternum.
South Australia; near Port Lincoln.

militaris, sp. nov. Mas. Fere lævis, sparsim obscure punctulata; glabra; picea elytris pedibusque manifeste, antennis vix manifeste, rufescentibus; capite haud (vel vix manifeste) bifoveolato; prothorace æquali sat transverso leviter cordato; elytris prothorace dimidio longioribus, humeris callosis, striis suturalibus sat fortiter impressis; antennis capiti prothoracique conjunctis longitudine æqualibus, fortiter clavatis; femoribus basin versus pedunculatis, intermediis subtus dente parvo armatis; tibiis intermediis ante apicem extus leviter emarginatis; metasterno late profunde excavato; abdominis segmento ventrali 2° in medio impresso et utrinque obscure tuberculato. Long., $\frac{9}{20}$ l.

Of the antennæ, joints 1 and 2 are much stouter than any of following six joints (which are of uniform thickness), 1 being ch longer than 2; 4, 6, and 8 are equal *inter se*, and are the rtest joints; 3 is equal to 2 in length, 5 a little shorter, 7 rly as short as 4, 6, and 8; 9 is strongly transverse, being rcely longer than 8, but much wider; 10 is still more transse, being a little longer than, and about twice as wide as, 9; is ovate, being twice as long as 10, but scarcely wider; 9 and each have a curved pencil of seta on either side at the apex.

Femina. A mare differt femoribus, metasterno, abdomineque simplicibus.

The antennæ of the female scarcely differ from those of the e except in being a trifle shorter.
South Australia; near Port Lincoln.

The species of *Eupines* described above may be thus tabulated

A. Glabrous or nearly so.
  B. Antennæ unicolorous, or nearly so ... militaris.
  BB. Apical joint of antennæ pallid, in strong contrast to joint 10.
    C. Sutural apex of elytra simple.
      D. Front femora and tibiæ toothed in male ... ... nauta.
      DD. Front femora and tibiæ simple in male ... ... spiniventris
    CC. Suture of elytra spiniform at apex ... ... nautoides.
AA. Body clothed with long erect setæ ... ... sororcula.

SILPHIDÆ.

CHOLEVA.

This genus seems to be fairly well represented in Australia although only two species have been described. Of these *C. australis*, Er., may be distinguished from all other species known to me by the following characters in combination :—Colour and pubescence black; mesosternum finely carinate; prothorax and elytra transversely strigose. *C. obscurus*, Macl., has not been formally described—the only indication of its character being a statement (Tr. Ent. Soc. N.S.W., II., p. 155) that it differs from *C. australis* in its pubescence being light coloured and its prothorax and elytra longitudinally, instead of transversely, scratched or striolated. If it is to be inferred that the prothorax is *distinctly* striolate longitudinally (in the same manner that it is transversely in *C. australis*) I am confident that I have not seen the insect; if the reference be merely to the slight longitudinally striolate appearance resulting (in many species of the genus) from the direction of the adpressed hairs which clothe the surface, there is nothing in the description which would distinguish *C. obscurus* from any species (with one or two exceptions) of *Choleva* known to me. In this latter case it is impossible to describe any new species without running some risk of re-naming Sir W. Macleay's insect; subject to that remark, the following appear to be new. It may be noted that in the Australian species of *Choleva* having the mesosternum carinate (so far as my own observation goes) the carina is not a strongly elevated one like that of the European *C. sericeus*, Fab., but a very fine line running down the centre of the segment, and usually becoming obsolete in the front part; the front part, however, consisting of a sort of thickened transverse fold, which is more *elevated* than the carina, although not truly carinate (as in

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many European *Choleva*, in which the mesosternum is non-carinate).

C. australis, Er. The specimens which I attribute to this species were taken in the neighbourhood of Adelaide. The only doubt I feel as to their identity is caused by the antennæ being a little stouter than seems quite consistent with the description, which, however, is very brief and general in respect of the antennæ. They are very much like those of the European *C. sericeus*, Fab., to which, indeed, the insect before me bears a very close general resemblance, differing chiefly in its more uniformly black colour (the base of the antennæ even being only a little pitchy), in its very much more finely carinate mesosternum, and in the more rounded sides of its elytra, which are decidedly dilated behind the base; the sculpture of the upper surface scarcely differs in the two species. I am doubtful of having seen the male of *C. australis*, as I do not find any decidedly sexual differences among the few examples I have examined, the tarsi of none of them being distinctly dilated

C. antipodum, sp. nov. Sat elongata; minus parallela; piceo-ferruginea (antennarum articulis basalibus 2 apicalique, capite antice, prothoracis lateribus, pedibus, et corpore subtus, dilutioribus); obscure piceo-pubescens; creberrime subtilissime punctulata; antennis gracilibus, articulo 8° quam 7^{us} tenuiori nec breviori; mesosterno antice simplici, inter coxas intermedias spiniformi. Long., $1\frac{3}{5}$ l.; lat., $\frac{7}{10}$ l.

The antennæ are considerably more slender than in any European species known to me of *Choleva* (*e.g.*, *C. agilis*, Illig.). They are conspicuously longer than the head and prothorax together. Joint 1 is much stouter and slightly shorter than 2; joints 3-6 are of equal thickness *inter se*, more slender than 2; 3 slightly longer than (4-6 each about equal to) 2; 7 slightly shorter and a little wider than 6; 8 as long as, but evidently narrower than, 7; 9 and 10 wider, and slightly shorter, than 8; 11 scarcely wider, but evidently longer, than 10, and acuminate at apex. I do not find any well-marked sexual characters. The mesosternal carina scarcely emerges forward from between the coxæ; the puncturation is finer and slightly closer than in (say) the European *C. tristis*, Panz.

Victoria; in the Alpine district, under fallen leaves.

C. Adelaidæ, sp. nov. Minus elongata; ovalis; ferruginea, capite prothoracisque disco obscurioribus; fulvo-pubescens; supra subtiliter (in prothorace subtilissime) transversim punctulato-strigosa; antennis sat brevibus robustis, articulo 8° quam 7^{us} et 8^{us} paullo angustiori multo breviori; mesosterno subtiliter carinato. Long., 1 l.; lat., $\frac{1}{2}$ l. (vix).

The antennæ are scarcely longer than the head and prothora together, and seem in respect of robustness and build not ver different from those of common European species (*e.g.*, *C. sericea* Fab.). Joints 1 and 2 are stouter than those immediately fo lowing—1 evidently longer than 2; 3-6 moderately increasing i width (3 scarcely shorter than 2, 4 and 5 shorter subequal *inte se*, 6 considerably shorter; 7-11 forming a subparallel club whic is nearly as long as joints 1-6 together; 7, 9, and 10 subequa *inter se* (each evidently wider than, and about twice as long a 6); 8 same width as 6, but still shorter; 11 subconical, a littl longer and narrower than 10; joint 6 is strongly, and 8 ver strongly, transverse. The sculpture of the upper surface is nearl as in *C. australis*, Er. In the male the front tarsi are prett strongly (the basal joint of the intermediate tarsi scarcely, if a all) dilated. An example from Port Lincoln has the antenn with the longer joints testaceous, the shorter one, piceous, bu does not seem to differ otherwise.

South Australia; in flood refuse near Adelaide, also near Por Lincoln.

C. Victoriensis, spec. nov. Sat elongata; sat parallela; piceo-fer ruginea, antennarum basi prothoracis lateribus, pedibusqu rufescentibus; obscure pubescens; capite prothoraceque sub tiliter crebre, elytris minus subtiliter minus crebre, punctu latis; antennis minus elongatis, sat robustis, articulo 8° quar 7^us^ et 8^us^ multo angustiori multo breviori; mesosterno sub tiliter carinato. Long., 1 l.; lat., $\frac{2}{5}$ l.

The antennæ are perhaps a trifle longer than the head an prothorax together; they are evidently more slender than thos of *C. Adelaidæ*, but much stouter than those of *C. antipodum* The basal six joints are proportioned *inter se* almost as i *C. Adelaidæ*, but are more slender; 3-6 of equal width (not as i *Adelaidæ*, 4-5 each a little wider than its predecessor); joints 7-1 form a parallel club less noticeably wider than the basal part o the antennæ than in *Adelaidæ*, but with joints similarly propor tioned *inter se*; owing to the much greater slenderness of th antennæ, however, joint 6 is not, and 8 is only moderately, trans verse. The sculpture of the upper surface resembles that o *C. antipodum*, but is decidedly less fine on the elytra. In th male the front tarsi are strongly, and the basal joint of the inter mediate tarsi is distinctly, dilated.

Victoria; Alpine district, among fallen leaves.

C. minuscula, sp. nov. Vix elongata; subovalis; fusco-rufa antennarum articulis intermediis, elytris abdomineque obscu rioribus; pubescens; subfortiter minus confertim punctu lata; antennis fere ut *C. Victoriensis* sed fere gracilioribus mesosterno simplici. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{5}$ l. (vix).

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The antennal joints are proportioned *inter se* almost exactly as the preceding two species, the antennæ as a whole being, however, a trifle more slender than, but of about the same length as, ose of *C. Victoriensis*; they are clearly less slender than those *C. antipodum*. The puncturation of the upper surface is conicuously less fine than in *C. Victoriensis*. In the male the ont tarsi are only gently and the intermediate scarcely if at all ated. The general appearance is very suggestive of the Euroan *C. Wilkini*, Spence; but the puncturation is distinctly arser, and the antennæ are more slender than in that species. South Australia; widely distributed; in vegetable débris.

N.B.—The following is a tabulation of the described Australian ecies of *Choleva*, the only one omitted, so far as as I know, ing *C. obscura*, Macl.

Mesosternum carinate.

B. Antennæ of ordinary character.

C. Prothorax transversely strigose.

D. Size very small; colour not black... ... Adelaidæ, Blackb.

DD. Size moderate; colour black ... ... australis, Er.

CC. Prothorax not transversely strigose ... ... Victoriensis, Blackb.

BB. Antennæ very long and slender antipodum, Blackb.

A. Mesosternum simple ... ... minuscula, Blackb.

CHOLEVOMORPHA, gen. nov.

n. *Cholevam* simulat; differt trochanteribus posticis fere ut *Anisotomæ* formatis; tibiis omnibus spinosis; antennis gracillimis; maris tarsis anticis 3-unguiculatis.

This singular insect would have to be referred to the *isotomides*, on M. Lacordaire's arrangement, although its facies much more that of the *Silphides*. The species before me has e appearance of a very wide robust *Choleva*, with extremely fine nder antennæ and variegated elytra. The antennæ are idently longer than the head and prothorax together; all the nts are much longer than wide, and are thinly beset with ngish fine setæ; of the basal six joints, joint 2 is the stoutest (1 ing much longer, but scarcely so stout), 3-6 very slender (4-6 arcely, 3 considerably, shorter than 1), 7-11 form a feeble club eing together very little shorter, but evidently stouter, than 6 together), and are somewhat equal *inter se*, except joint 8, hich is much shorter and evidently more slender than the rest evertheless, joints 7 and 9 are evidently longer than 10 and 11). he mesosternum is not carinated, although it is very convex, and esents somewhat the appearance of coming to a ridge down the

middle line. In the male, the front tarsi have their basal joint triangular and strongly dilated, joints 2 and 3 dilated, but successively less so; joint 4 is very small, 5 oval and dilated as long as the preceding three together; joint 5 bears at its apex three unequal claws, of which one (the longest) is inserted immediately before the apex, and is strongly curved and scarcely shorter than the apical joint of the tarsus, while the other two are *at* the apex and are much shorter—one shorter than the other. The intermediate tarsi of the male are considerably longer than the front, and scarcely shorter than the hind, ones; these four posterior tarsi scarcely differ *inter se*, except that the basal joint of the intermediate is evidently dilated. In both pairs, joints 1 and 5 are of equal length, and each as long as joints 2-4 (which are subequal *inter se*) together. The claws are obtusely subdentate at the base. The spines on the front tibiæ are fine and inconspicuous; those on the four posterior strong and well defined. All the tibiæ are bispinose at the apex. The female scarcely differs from the male, except in having the anterior four tarsi and the front claws simple.

The superficial sculpture of the insect on which I am founding this genus is very unusual, and extremely like that of *Catops australis*, Er. I have examples of the latter species (or a very close ally of it) in my collection and, notwithstanding this curious resemblance, find that it cannot be associated generically with this new form; it appears to me to be a true *Choleva*.

C. picta, sp. nov. Sat late ovalis; parce pubescens; nigra, antennarum basi, prothorace antice et latera versus, elytrorum maculis nonnullis, pedisbusque, plus minus testaceis vel rufis; prothorace minus crebre granulato, fortiter transverso antice fortiter angustato, angulis posticis retrorsum vix productis; elytris crebre transversim punctulato-striatis, stria suturali sat fortiter impressa. Long., $1\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l.

The pale markings on the elytra are not at all strongly defined in themselves, but are rendered conspicuous by their being clothed with golden pubescence; they consist of a large humeral blotch, a smaller common spot on the suture some distance behind the scutellum, two smaller spots on the front part of the disc, and an irregular narrow fascia of zigzag form about the middle. In some examples some of the markings are wanting.

Victoria; among fallen leaves on the higher mountains (Feathertop, &c.).

SCAPHIDIIDÆ.

SCAPHIDIUM.

S. alpicola, sp. nov. Nitidum; nigrum; prothorace (margine basali et maculis 2 discoidalibus ante medium positis nigris

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exceptis), elytrorum fasciis binis suturam versus abbreviatis, pygidio (macula nigra excepta) et corpore subtus (prosterno medio, mesosterno, metasterni lateribus margineque postico, et abdominis basi nigris exceptis) rufis; oculis minus approximatis; prothorace postice linea transversa arcuata punctulata instructo, lateribus fere rectis; elytrorum sutura et ad basin linea arcuata punctulata impressis, his in medio disci punctularum seriebus 2 antice et postice abbreviatis instructis.

Maris tibiis anticis elongatis, basi fortiter arcuatis; metasterno punctulato pubescenti, utrinque pilis longissimis penicillam formantibus. Long., $2\frac{1}{2}$ l.; lat., $1\frac{1}{8}$ l.

Colour and markings have been so much relied on in most of the descriptions of Australian *Scaphidia* that it is difficult to specify distinctions other than colour in adding a new species. I have seen several specimens of the insect before me, which I took in decayed wood. Its colouring comes nearest to *S. exornatum*, Oberthür (known to me only by description). In that species the base of the antennæ is said to be red, the femora partly red, the underside (except the apex) black, and the markings of the elytra appear to consist of black spots on a red derm; all these differences point clearly, I think, to specific distinctness—but even if the present insect should be an Alpine form of an already named species, it would be desirable to give it a var. name, as all the examples I have seen are quite identical in colour and markings.

Victoria; in the Alpine district.

SCAPHISOMA.

S. novicum, sp. nov. Obovatum; nitidum, sparsim valde leviter punctulatum; nigrum, palpis antennarum basi pedibus et elytrorum apice testaceis vel rufis; scutello vix manifesto; elytrorum stria suturali prope basin extrorsum arcuata.

Maris metasterno utrinque postice longitudinaliter profunde sulcato, segmento ventrali penultimo minus abbreviato. Long., $\frac{4}{5}$ l.; lat., $\frac{2}{5}$ l.

This species is scarcely distinguishable except by its smaller size, much more feebly impressed (though otherwise very similar) puncturation, and sutural stria bent outward at the base, from the European *S. agaricinum*, Leach. The sexual characters of *S. agaricinum*, however, do not seem to have been recorded, and my type of that insect is a female, so I cannot say whether they are similar to those of *S. novicum*. The male example of the latter, from which I have described what I suppose to be sexual characters is immature (it is almost uniformly testaceous in colour), but I do not think the metasternal characters mentioned

above can be due to immaturity as they are quite symmetrical
either side. It was taken in company with the other specimens
Victoria; Alpine district, in fungi.

HISTERIDÆ.

CHLAMYDOPSIS.

I feel some hesitation in referring the following two species
this genus, nor do I feel sure that they ought not to be regarde
as members of *two* allied genera, both distinct from *Chlamydops*
They certainly, I think, appertain to the *Histeridæ*, and the
agree very fairly with Professor Westwood's characters of th
said genus (I do not feel quite satisfied whether the antennæ ha
eight or nine joints) as far as those characters go, but it appea
to me that if those characters were drawn up from a species
all closely allied to those before me, they do not sufficiently ind
cate the extraordinary appearance of the insects, which a
among the most wonderful I have ever seen. The two exampl
before me differ very strongly *inter se* (probably they are ma
and female of two species), but they agree in the remarkable rel
tion of the head and prothorax to each other—a character
singular that I do not like to separate them generically. Th
head, including the antennæ, exactly fits into the cavity of th
prothorax, without protruding from it in the smallest degree,
that in repose the insect appears to have no head, and whe
looked at from in front the appearance is of the cavity of th
prothorax being stopped by an even vertical plate. If the a
tennæ be drawn out (no easy task!) the head is visible—th
cavity of the prothorax being looked at from in front—occupyin
the middle portion of the cavity, and having on either side of
a large cavern, which is exactly filled by an antenna when the i
sect is in a state of repose. The antennæ are on the same pla
as those of the *Dynastid*-genus *Cryptodus*, consisting of a lar
lamelliform basal joint (which is the joint that forms the door
the aperture of the antennal cavity), into the hind surface
which is inserted a very short stem,* at the end of which is
very elongate club, consisting of a single joint. All the tarsi
completely into cavities in the tibiæ; the front tibiæ fall in
grooves of their femora, the front legs fit completely and exactl
into cavities at the sides of the prosternum. The whole upp
surface is uneven, in a manner defying exact description. Th
body is furnished with wings. The prosternum is produced a
teriorly as in the "Histérides vrais" of Lacordaire. The pr
sternum and mesosternum present truncate and closely applie
faces to each other.

* As already noted, I cannot satisfy myself whether this consists of six
seven joints; but seven is the more probable number.

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In the above characters the two examples before me coincide; y differ very widely in the nature of the inequalities of the face; in one of them having the hind legs developed to such extraordinary degree that these are longer than the body, ile the hind tibiæ are strongly compressed, and dilated to h an extent that their greatest width is scarcely less than half width of the prothorax; and in one of them having lateral ressions for the reception of the posterior legs.

It will probably be observed that these characters come very ar those of Archdeacon King's genus, *Byzenia*, which that rned author attributes to the *Byrrhidæ* (Tr. Ent. Soc. N.S.W., , p. 74). I have very little doubt that *Byzenia* is really very ar the species I am describing (or that it is a *Histerid*), but the chdeacon says its "legs are not received into cavities," and s is, perhaps, inconsistent with generic identity. In the de- iption of *Chlamydopsis*, Professor Westwood implies (though does not state it quite categorically) that there are no cavities the reception of the legs, and, therefore, I suspect *Byzenia* l *Chlamydopsis* are identical (the memoirs characterising them re read in the same year; I believe Westwood's was published ore the other). As regards the insects before me, the existence cavities to receive some or all of the legs would perhaps justify ir having a new generic name (or names), but as they are arly close allies of *Chlamydopsis* I do not think any confusion l arise if I attribute them to the latter genus in the doubt as the relation of its legs to the body.

I believe the two species described below to be parasitic on sorial *Hymenoptera*, as I found them both (in different years l different places) on the top of rotten fence posts in which *menoptera* were making their nests.

sternalis, sp. nov, Mas (?). Subopaca; piceo-ferruginea, antennis pedibus elytrisque dilutioribus; subtiliter punctulata et strigosa, puncturis strigisque confuse intermixtis, illis squamas minutas ferentibus; prothoracis lateribus fortiter bisinuatis, disco a basi ad apicem gradatim elevato cristam magnam formanti (cristæ apice subbifido, lateribus declivibus longitudinaliter bisulcatis, facie anteriori verticali subnitida punctata); scutello haud perspicuo; elytrorum humeris valde callosis; pygidio propygidioque verticalibus; pedibus brevibus; prosterno medio longitudinaliter late fortiter carinato, carina media longitudinaliter profunde sulcata. Long., $1\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l. (vix).

The posterior four tibiæ are triangular; the apex of the triangle ng regarded as the point of attachment to the femur, its longest e is the inner margin, and its other sides (subequal) are the ernal margin of the tibia and the obliquely truncate apex of

the same. The front tibiæ are not very different, but their e
ternal margin is distinctly shorter than their obliquely trunca
apex, and forms an obtuse tooth at the point of junction with t
latter. The legs are about of equal length *inter se*—all evident
shorter than (say) the length of the elytra.

Sonth Australia; near Woodville.

C. inæqualis, sp. nov. Femina (?). Minus opaca; piceo-ferr
ginea, antennis dilutioribus; crassissime punctulato-strigo
(elytrorum parte basali media, metasterno, abdominisque se
mentis basalibus et apicalibus, subtiliter, fere ut *C. sternal*
sculpturatis exceptis), abdominis parte intermedia fere læv
prothorace antice valde reflexo elevato-marginato (margi
elevato 6-lobato, lobis intermediis 4 quam externi min
elevatis multo minus latis), margine antico quam basis s
latiori, lateribus mox pone marginem anticum retrorsum co
vergentibus hinc ad basin parallelis; scutello haud perspicu
elytrorum humeris externe spiniformibus, callis humeralib
maximi gibbosis, parte basali mediana valde depressa (h
subtiliter sculpturata), a parte postica (hac crassissime scu
turata) sulco profundo transverso divisa; pygidio prop
gidioque rotundatim subverticalibus; pedibus anticis 4 qua
elytra (posticis quam corpus totum) longioribus; proster
æquali. Long., 21. (vix); lat., 11.

The six lobes into which the strongly upturned front marg
of the prothorax is divided are not very apparent unless the o
line be looked at obliquely from behind, or from in front. T
tibiæ (allowing for the much greater length of the legs) are shap
very much as those of *C. sternalis*, except that the exter
margin of the intermediate pair meets the truncate hind marg
(as in the front pair) in a strong obtuse tooth, and that the
ternal margin of the hind pair is very much longer than t
truncate hind margin.

South Australia; near Woodville.

PHALACRIDÆ.

The only Australian species that I can ascertain to have be
already described belonging to this family is *Phalacrus brunne*
Er., from Tasmania, for which, together with *Sphæridi*
testaceum, Fab., Dr. Erichson (Ins. Deutsch. III., p. 108) found
a new genus—*Litochrus*. In 1889 a revision of the family, w
especial reference to the N. American species was published
the Annals of the New York Academy, in which *Litochrus* see
to have been re-described. I have not been able to consult t
memoir, but from the notice of it in the "Zoological Record,"
should infer that neither of the species attributed to *Litochrus*
Erichson has been removed from it. I will, however, take

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ıtion of saying that the following species placed in this are, no doubt, congeneric with *L. brunneus*, Er. That is, unfortunately, not very minutely described by its r; I do not think, however, that any of the species de- d below can be identical with it. *L. alternans* is the one comes nearest to it, but it does not seem likely that if son had had that insect before him he could have failed to on the conspicuous sculpture of its alternate interstices.

LITOCHRUS.

iculus, sp. nov. Breviter ovalis; postice vix angustatus; nitidus; niger; capite antice, elytrorum apice et utrinque nacula magna discoidali, antennis, palpis, prothorace lateri- ous, corpore subtus et pedibus rufo-testaceis; capite pro- horaceque vix perspicue punctulatis; elytris vix striatis, triis interstitiisque subtilissime punctulatis. Long., 1 l.; at., $\frac{3}{5}$ l.

e pale markings on the elytra consist of a wide curved blotch nencing on either shoulder and proceeding towards the e and almost touching it at the middle of its length; the apex of the elytra is produced forward on either side in such on that it almost touches the exterior hind corner of the l blotch. The pale colouring occupies almost as much area e black; the latter forms a large triangle, the base of which base of the elytra, and its apex is produced narrowly down uture to about the middle where it dilates into a large h; there is also a large black space on either side, which is nuous along the base with the black of the suture.

ctoria; Alpine district.

almerstoni, sp. nov. Breviter ovalis; postice leviter angus- tatus; nitidus; ferrugineus; antennis, palpis, elytrorum apice, pedibus, et corpore subtus, testaceis; vix perspicue punctulatus; elytris vix striatis. Long, $\frac{4}{5}$ l. (vix); lat., $\frac{1}{2}$ l.

is minute insect appears to be a typical *Litochrus*. Its uni- ferruginous colour, with the apex of the elytra pale tes- ous, and almost impunctulate surface, will, I think, distinguish om all its described congeners.

. Territory of S. Australia; near Palmerston.

lternans, sp. nov. Ovalis, postice attenuatus; nitidus; supra lividus, hic illic infuscatus, cœruleo-iridescens, an- tennis palpis pedibus et corpore subtus testaceis; capite pro- thoraceque subtilissime crebre punctulatis, hoc puncturis nonnullis majoribus hic illic impresso; elytris, vix striatis, striis puncturis minutissimis sat crebre impressis, interstitiis alternis sublævibus et puncturis sat magnis seriatim sparsim instructis. Long., $1\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

This species seems to be well distinguished by its peculi puncturation—very fine, close, and evenly distributed—the p thorax bearing also a few scattered punctures evidently mu larger; and the elytra having their scarcely marked striæ close set with excessively fine punctures, while a conspicuous row considerably larger and widely spaced punctures runs down terstices 1, 3, &c., 2, 4, &c., being almost lævigate; thus t widely spaced punctures of the alternate interstices are much t strongest sculpture of the elytra.

Victoria; Alpine district.

L. maculatus, sp. nov. Breviter ovalis; postice vix angustatu nitidus; piceus; antennis, palpis, pedibus, capite anti corpore subtus, et macula magna triangulari communi elytrorum medio posita, testaceis; capite prothoraceq creberrime subtilissime punctulatis; elytris vix striatis, str puncturis subtilibus seriatim impressis, interstitiis alter sublævibus et puncturis sat perspicuis seriatim sparsim structis. Long., 1 l.; lat., $\frac{3}{5}$ l. (vix).

The colouring of this species (which seems to vary only a lit in intensity, and in the elytra of some examples being reddi towards the apex) will, I think, distinguish it from all its c geners. Its sculpture is very like that of *L. alternans* (thou the punctures in the alternate interstices are scarcely larger th in the striæ), but its size and shape, as well as its markings, a very different and seem to be constant. A short series taken the Victorian Alps seems attributable to this species, althou the specimens vary greatly in size, some being quite twice large as the South Australian examples; the red spot common the elytra is, moreover, in most of this Victorian series (especial in the larger examples) evidently less conspicuous.

S. Australia; common in the Port Lincoln district.

L. suturellus, sp. nov. Breviter ovalis; postice parum angu tatus; nitidus; piceus vel rufo-piceus; antennis, palp prothoracis et elytrorum marginibus (sutura inclusa), corpo subtus, pedibusque, testaceis; capite prothoraceque subtil sime confertim (parum perspicue) punctulatis; elytris v striatis, striis subfortiter punctulatis, interstitiis (præserti suturam versus) confuse perspicue punctulatis. Long., $\frac{5}{8}$-1 l lat., $\frac{1}{2}$ l.-$\frac{3}{5}$ l. vix).

This species may be distinguished from the others known me by the conspicuous paleness of its suture, which seems to constant; it may be known from the two preceding by the mu more strongly punctured striæ of its elytra and the quite differe style of the puncturation of the interstices, which does not va alternately, but becomes gradually feebler from that nearest t

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ure (where it is nearly as strong as in the striæ) towards the ernal margin, the interstices between the middle of the elytra l the margin being scarcely visibly punctulate. The sculpture the elytra is very much as in the European *Phalacrus caricis*, rm., the punctures in the striæ and in the inner interstices ng about as they are in that species. The punctures in the æ scarcely become feebler towards the lateral margin, nor are y very much finer even close to the apex.
Western Australia.

lateralis, sp. nov. Breviter ovalis; postice parum angustatus; nitidus; piceo-niger, capite et elytrorum apice paullo rufescentibus, antennis palpis pedibus et corpore subtus testaceis (his nonnullis exemplis paullo infuscatis); capite prothoraceque confertim perspicue punctulatis; elytris vix striatis, striis subfortiter punctulatis; interstitiis omnibus æque confuse perspicue punctulatis. Long., 1—1⅛ l.; lat., ⅜—½ l.
var? *major*; prothorace sat late rufo-cingulato. Long., 1¼ l.; lat., 1 l.

This species is larger than *L. suturellus*, and is very differently oured; in shape and sculpture the two are very similar, except *L. lateralis* having the lateral interstices of its elytra punctured te as strongly as the interstices near the suture.
South Australia; near Port Lincoln. The var? *major* was en near Adelaide.

frigidus, sp. nov. Sat breviter ovalis, postice parum angustatus; nitidus; antennarum clava, capite, prothoraceque (lateribus rufescentibus exceptis), nigris; elytris rufescentibus hic illic infuscatis; ceteris rufo-testaceis; capite prothoraceque subtilissime confertim punctulatis; elytris vix striatis striis subfortiter punctulatis, interstitiis omnibus obscure punctulatis. Long., 1 l.; lat., ⅜ l.

The most noticeable character of this species is the black club its antennæ, of which moreover the stem is more slender than the other species known to me of *Litochrus*, with the seventh nt scarcely, if at all, longer than the sixth. In the other cies I have not found any very available antennal distinctive aracters, but they all seem to have the seventh joint distinctly ger than the sixth, and also the third conspicuously elongated. e fact is the antennæ (owing to the compression of the apical nts, which seem more convex moreover on one of the compressed es than the other) appear different in two examples of the same cies unless they are absolutely similarly brushed out, and in se minute insects it is difficult to be sure one has attained this ult. The puncturation of the elytra in this species is not ch different from that of *L. lateralis*, but owing to the ex-

tremely shining surface and lighter colour of the elytra, the puncturation is less noticeable unless examined under a powerful magnifier.

Victoria; a single example embedded in snow on one of the higher mountains.

LITOCHRUS (?)

The next two species represent a type which can hardly stand as truly congeneric with the preceding, as the tibiæ are devoid of apical spines, and the basal joint of the hind tarsi is shorter than the second. It agrees with *Litochrus* in having the hind tarsi evidently longer than the intermediate, in its metasternum produced to the extent of concealing the mesosternum, and in its subglobular front (and adjacent hind) coxæ, &c., &c. I should have no hesitation in founding a new genus for it were it not that I have not been able to consult the diagnoses of the new American Phalacrid genera already referred to, and it is possible that it may pertain to one of them. I find that in the species before me, the clypeus is somewhat more developed than in the preceding, encroaching somewhat on the labrum.

L. (?) alpicola, sp. nov. Nitidus; subcuneiformis; postice fortiter angustatus; obscure rufo-testaceus, capite prothoraceque subinfuscatis; his leviter sat crebre punctulatis; elytris vix striatis, striis subtiliter perspicue (interstitiis subtilissime seriatim) punctulatis. Long., 1 l.; lat., $\frac{3}{8}$ l.

The most distinctive specific character of this insect seems to be its shape, the sides converging strongly in a curved manner hindward from close to the base of the elytra. The puncturation of the head and prothorax is decidedly less fine than in any of the species of *Litochrus* described above, but it is very faintly impressed.

Victoria; Alpine district.

L. (?) uniformis, sp. nov. Latus; fere rotundus; ferrugineus sublævis; elytrorum stria suturali postice manifeste impressa. Long., $\frac{4}{5}$ l.; lat., $\frac{7}{10}$ l. (vix).

The whole surface under a powerful Coddington lens shows scarcely a trace of sculpture of any kind—merely the faintest indication of very minute puncturation—except the sutural stria of the elytra, which is moderately defined in the hinder two thirds of its length. In the example before me all the margins (including the suture) of the elytra are narrowly and obscurely infuscate.

S. Australia; near Adelaide.

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PHALACRINUS (gen. nov.).

halacro differt antennarum clava sat laxe articulata, clypeo antice producto labrum obtegente, mesosterno late manifesto a metasterno haud obtecto, coxis anticis minus globosis, tarsis brevibus inter se longitudine sat æqualibus, his vix perspicue 5-articulatis, posticorum articulo 2° quam 1^us^ paullo breviori.

his genus has quite the facies of *Phalacrus*, but as will be by the above diagnosis there are structural peculiarities h almost suggest hesitation in placing it in the family *lacridæ*; especially the extreme indistinctness of the 4th l joint, and the feeble globosity of the front coxæ.*

ustralis, sp. nov. Nitidus; subcuneiformis; postice fortiter angustatus; testaceus; elytris plus minus infuscatis; subtilissime lævis, elytris distincte striatis, striis postice (externis totis) punctulatis, interstitiis postice subconvexis. Long., $1\frac{1}{5}$ l.; lat., $\frac{7}{10}$ l.

he interval between the outermost stria and the lateral margin of the elytron is very wide anteriorly (about two-fifths of the h of the whole elytron); but it narrows hindward very kly, and is in the hinder half of its length of almost uniform h, and less than half as wide as in front. Each elytron bears riæ, none of which quite reach the base except the 4th, 5th, 7th, and 8th, and of *these* only the 7th and 8th are more very faintly indicated close to the base. The striæ become er and more strongly punctulate successively from the suture rd the lateral margin, and also from the base hindward, the turation of the 3 or 4 striæ nearest the suture being scarcely ated in front. The 9th stria terminates in front by running er indistinctly into the 8th considerably behind the base of lytron, and the 7th and 8th are connected on the base. (In examples, however, the anterior inflected part of these e is scarcely traceable, so that the 8th and 9th striæ seem to inate independently) The infuscation of the elytra is

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ince writing these remarks I have had the advantage of receiving a unication from Mr. A. Sidney Olliffe, the Colonial Entomologist .S. Wales, who has been kind enough to examine a specimen of *ustralis* for me. Mr. Olliffe is a high authority on the Clavicorn genera, e opinion is much more valuable than mine. He regards what I have to be a minute 4th joint of the tarsi as merely a basal dilation of the l joint, and cannot discover a suture. I have no doubt he is right, hat my observation was incorrect. Apart from this difficulty, Mr. e would be disposed to refer the insect to the *Phalacridæ*, but regards objection as a very serious one. However, as it seems to me that *acrinus* would be much more out of place in any other family, I have ght it on the whole best to let it stand where I have placed it, and at ame time to record the notes with which Mr. Olliffe has favoured me.

variable, it appears never to extend to the portion between th 9th stria and the lateral margin; in some examples it consist merely in the *striæ* being darker than the general colour, and i others it suffuses nearly the whole disc. The sculpture (excludin the punctulate striæ of the elytra) is so fine that the insect ma almost be called lævigate, but the space between the 9th stri and the lateral margin is a little more distinctly punctulate tha the general surface. On the underside the puncturation is nc much more distinct than on the upper surface except on the side of the metasternum, where it is moderately defined.

S. Australia; Port Lincoln, also near Morgan.

P. obtusus, sp. nov. Latus; postice quam antice parum fortiu angustatus; elytrorum striis minus perspicue punctulatis cetera ut *P. australis*. Long., $1\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l.

The difference of this insect from the preceding in respect o shape strikes the eye at once, this being at its widest scarcely i front of the middle, and being not much more narrowed hind ward than in front, while in *australis* the greatest width is con siderably in front of the middle, and the front part of the insec is wide and obtuse, with the hinder part strongly narrowed. I *obtusus* none of the striæ are distinctly punctulate, while i *australis* the external striæ are dotted with well-defined isolate punctures.

S. Australia; near Port Lincoln.

P. rotundus, sp. nov. Rotundus; brevis; elytris haud longiori bus quam conjunctim latioribus; his margine laterali latis simo, striis minus crebre punctulatis; cetera ut *P. australis* Long., 1 l.; lat., $\frac{4}{5}$ l.

This species is exceedingly close to the preceding two, but it shape is so distinctly different that I cannot regard it otherwis than as a good species. Its outline is nearly a circle, the elytra down the suture being (by measurement) not at all longer tha they are together wide at their widest part; in the preceding tw species they are distinctly longer than together wide. Th interval between the 9th stria and the lateral margin is i *P. rotundus* distinctly wider than in the preceding two species especially in its hinder part. The puncturation of the striæ i stronger than in *P. obtusus*, and the punctures are less closel placed than in *P. australis*.

S. Australia; near Port Lincoln.

PHALACRUS.

P. corruscus, Panz. A *Phalacrus* occurring commonly i South Australia, and which I have met with in Victoria also appears to me incapable of separation from this Europea species.

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Burrundiensis, sp. nov. Breviter obtuse ovalis; convexus; nitidissimus; niger; antennis pedibusque piceis; elytris perspicue striatis, interstitiis puncturis sat subtilibus biseriatim leviter impressis; antennarum clava minus elongata, articulo ultimo præcedentibus 2 conjunctis vix longitudine æquali, apice minus acuminato. Long., $1\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l.

This species is very like *P. corruscus*, Panz., but differs in being evidently wider insect in proportion to its length, in its more nly rounded sides—the greatest width of the body being a e behind, rather than at, the base of the elyrta—and in the joint of the antennæ being scarcely so long as the preceding together, and being of more conical form, with the apex nt. The puncturation of the elytra, too, when attentively mined, is seen to be different. In *corruscus* it is fine, close, even, there being no striæ (except the sutural one), and rcely a trace of longitudinal arrangement in any part of the cturation. In the present species the elytra are very feebly ated throughout, the striæ for the most part running in pairs ch pair very close together), and the spaces between the eral pairs of striæ (which are much wider than those between striæ of each pair) bear each two rows of punctures, which very faintly impressed rather than very fine, but are quite cernible under a good lens. In the example before me the cal joint of the antennæ is obscurely testaceous.

Northern Territory of S. Australia.

OLIBRUS.

Victoriensis, sp. nov. Latus; breviter ovalis; nitidus; testaceo-rufus; capite postice et prothorace (lateribus et basi exceptis) obscurioribus; capite prothoraceque subtilissime confertim punctulatis; elytris punctulato-substriatis, interstitiis perspicue minus crebre punctulatis. Long., $1\frac{1}{4}$ l.; lat., $\frac{4}{5}$ l.

This insect seems to possess all the characters of *Olibrus*, the d tarsi longer than the intermediate, with basal joint shorter n the second, tibiæ having apical spines, &c., &c. Compared h *O. corticalis*, Sch., it is a good deal wider in proportion to its gth, and is considerably less attenuated behind, and less vex; the puncturation of its elytra is as strong in the interes as in the striæ, and is slightly stronger than in *lacrus caricis*, Sturm.

Victoria; in the Alpine district.

NITIDULIDÆ.

In recently working through the specimens belonging to this ily in my collection, I have been surprised to find how little

use describers have made of the presence or absence (and t
shape) of a piece of the under-surface which is, I suppose, t
epimeron of the mesosternum, and which in some genera assum
a remarkable position and form; in *Meligethes (e.g.)* it appea
as a triangular plate separating from each other in the front ha
of their length the metasternum and the metasternal episternu
As I am not quite sure that I am right in deeming it the mes
sternal epimeron, I propose in the following descriptions, &
where I have occasion to refer to this piece, to call it the "inte
mediate plate," so as to avoid the risk of giving it a misleadi
name. I have looked through several works on the *Nitidulid*
(e.g., Reitter's "Systematische Eintheilung der Nitidularien," t
chapter on the "Nitidulaires" in the "Genera des Coléoptères
the corresponding chapter in the "Insecten Deutschlands") wit
out having found any discussion of this character—although
have no doubt it has been remarked by someone, if I could k
the right author. I have not access to a sufficiently large colle
tion of *Nitidulidæ* to be able to say how far this character wou
be available for purposes of classification in general; but so f
as concerns the Australian species and such European an
American ones as are respresented in my collection, the inte
position of this "intermediate plate" between the metasternu
and its episterna, and also its shape when so interposed, appe
to be distinctive of genera. I have examined a considerab
number of specimens of the following genera, and find th
"intermediate plate" in Cychramptodes, Meligethes, Pria, Ma
croura, Gaulodes, Nitidula, Cychramus, Ips (all well defined
and in Amphotis and Pocadius feebly discoverable; while in th
Brachypterides, Carpophilides, Epurræa, Haptoncus, Haptoncur
Soronia, and Omosita I do not find it at all discernible.

Another character that might, I think, be much used wi
advantage in classifying the *Nitidulidæ* is the degree of coars
ness of granulation of the eye. So far as I have been able
investigate the matter the granulation of the eyes in this fami
is of three distinct types. It is more or less fine in the Brach
pterides, Carpophilides, Epurræa, Haptoncus, Haptoncura, Nitidul
Amphotis, Omosita, Meligethes, Pocadius, Macroura, Pria, Ip
In the other genera, viz., Soronia, Gaulodes, Lasiodactylu
Cychramptodes, Idæthina, Æthinodes, Cychramus, it is coarse
but of those with more coarsely granulated eyes *(i.e.*, with th
facets large) some have the individual facets almost flat *(e.g*
Gaulodes, Cychramptodes), while others have them more or le
strongly convex, *Idæthina* (presuming my identification of th
genus to be correct) standing pre-eminent in respect of th
character.

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Victoriensis, sp. nov. Ovalis; pubescens; testacea, prothoracis disco utrinque, antennarum articulis ultimis 4 vel 5 vel 6, et elytrorum disco, infuscatis; confertissime minus subtiliter punctulata; prothorace quam longiori duplo latiori, antrorsum angustato, antice leviter emarginato, lateribus ab apice ad basin gradatim magis late reflexo-marginatis, angulis posticis bene determinatis retrorsum subproductis. Long., $1\frac{3}{5}$ l.—$1\frac{4}{5}$ l.; lat., $\frac{3}{5}$—$\frac{4}{5}$ l.

his species has entirely the facies of an European *Epurœa*, clearly belongs, I think, to the genus (or subgenus) *toncura*. Its pubescence and puncturation scarcely differ the same in *E. pusilla*, Hbst. Compared with that species much less elongate and parallel (more like *E. deleta*, Er., in ine), with the sides of the prothorax much less widely re-d (especially in front), the elytra less widely margined, tibiæ apical spines, &c.

f Australian *Haptoncuræ*, no doubt *imperialis*, Reitt, is its est ally. I have not, so far as I know, seen that species (the t habitat of which is not known), but it evidently differs from many characters, of which I may specify the puncturation doubt much stronger (*imperialis* is said to be "subtilissime tulata"), the front of the prothorax less strongly emarginate, The colours and markings, too, are evidently different, the horax having in *imperialis* on either side a black discal vitta, eviated in front; this species an elongate blotch (often al-obsolete), not more abbreviated in front than behind; the a in typical specimens of *imperialis* having (among other kings) a large common triangular, basal, dark spot. Of the ent species I have seen nothing like this in any specimen, but narily there is a large dark spot occupying the greater part of disc of each elytron, nearly reaching the suture and lateral gin, and widely separated from the base and apex. This spot ble to be altogether wanting (rarely), or extended over the e elytron, except the lateral margin. The females are pro-nally much broader and more robust than the males.
ictoria; on flowers in the Alpine district.

Lindensis, sp. nov. Ovalis; pubescens; testacea vel rufa; elytris maculatim et corpore subtus, plus minus infuscatis; leviter (in prothorace sat crebre in elytris magis sparsim) punctulata; prothorace quam longiori vix duplo latiori, antrorsum sat angustato, antice subbisinuato, lateribus angustissime reflexo-marginatis, angulis posticis sat rotundatis. Long., $\frac{4}{5}$—$1\frac{1}{5}$ l.; lat., $\frac{2}{5}$—$\frac{3}{5}$ l.

his little species is evidently closely allied to *H. liliputana*,

but differs *inter alia* in its less closely punctured prothorax, wit rotundate-obtuse hind angles. From the two other previousl described Australian species, and from *H. Victoriensis*, it diffe in the very narrow margins of its prothorax. The infuscation its elytra (which is never clearly defined) consists of a shadin round the scutellum and a vitta down the disc of each elytro which is dilated near, but does not reach, the apex; this vitta liable to be broken into several small patches, or even to b scarcely discernible, and in some examples the shading round th scutellum is very faint. In some examples the underside entirely rufous, in others the metasternum or hind body, or both may be more or less infuscate. The puncturation, I regret tha I cannot compare satisfactorily with that of any well-know species; the prothorax is finely alutaceous, and on this surface is (by no means closely) pitted with faintly impressed, but no very small, punctures; the punctures on the elytra are still mo sparse and faint.

S. Australia; common on flowers near Port Lincoln.

H. Meyricki, sp. nov. Ovalis; pubescens; testacea vel rufa elytris et corpore subtus plus minus infuscatis; prothora confertim sat subtiliter punctulato, quam longiori minu duplo latiori, antrorsum angustato, antice bisinuato, later bus angustissime reflexo-marginatis, angulis posticis rotu dato-obtusis; elytris sparsim leviter punctulatis. Long., 1 l lat., $\frac{1}{2}$ l.

This species is very like *H. Lindensis*. I do not find any not worthy difference in the colours, except that in ordinary types this the infuscation of the elytra is almost confined to the regio of the scutellum, and that the general colour of the elytra is di tinctly paler than in *H. Lindensis*. It can be at once di tinguished from *Lindensis* by the much closer and less fai puncturation of the prothorax, and from *H. liliputana*, Reitt., b its different colour, less transverse prothorax, &c.

W. Australia; taken by Mr. E. Meyrick.

H. uniformis, sp. nov. Ovalis; vix pubescens; rufo-brunnea v nigro-brunnea; antennis palpis pedibusque rufis; minus su tiliter subsparsim æqualiter punctulata; prothorace qua longiori minus duplo latiori, antrosum angustato, antice su bisinuato, lateribus angustissime reflexo-marginatis, angul posticis rotundato-obtusis. Long., 1 l.; lat., $\frac{1}{2}$ l.

The unicolorous dark reddish or blackish brown colour of th species seems to be distinctive, as also its evenly distributed pun turation, which is evidently stronger than in the preceding tw species.

Victoria; on flowers in the Alpine district.

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B.—As the last three species described above have a con-ably different facies from *Epuræa*, owing to the very narrow al margins of their prothorax, I should have hesitated to them to *Haptoncura*, were it not for their being evidently allies of *H. liliputana*, Reitter. It will perhaps be well to ion that they possess the characters which in Herr Reitter's ation of the *Nitidulidæ* (verh. ver. Brünn, 1873) would refer to *Epuræa* (from which genus *Haptoncura* has since been ated), viz., prosternum not produced hindward, tarsi dilated, a nearly covering the pygidium, labrum emarginate, apex of libles simple, and in addition the tibiæ distinctly spined at pex and other characters distinguishing *Haptoncura*.

e described Australian species may be thus tabulated :—

ateral margins of prothorax widely reflexed.

B. Elytral markings consisting of a dark vitta ... ... Victoriensis, Blackb.

BB. Elytra not marked as in *Victoriensis* ... ... imperialis, Reitt., subquadrata, Reitt.

Lateral margins of prothorax extremely narrow.

B. Prothorax rectangular at base (colour uniformly testaceous) liliputana, Reitt.

BB. Hind angles of prothorax more or less roundly obtuse.

C. Prothorax and elytra differently punctured *inter se.*

D. Prothorax closely punctured ... Meyricki, Blackb.

DD. Prothorax faintly and less closely punctured ... Lindensis, Blackb.

CC. Puncturation of upper surface quite uniform uniformis, Blackb.

NITIDULA.

quadripustulata, Fab. This species (doubtless imported) is uncommon in the neighbourhood of Adelaide. I have not any previous notice of its occurrence in Australia.

SORONIA.

mulans, sp. nov. Sat late ovalis; pubescens; crebre punctulata; nigro-picea; prothoracis elytrorumque lateribus (his sat angustis) antennis pedibus et corpore subtus rufescentibus; prothorace quam longiori plus duplo latiori, antrorsum fortiter angustatis, antice sat fortiter vix bisinuatim emarginato, angulis posticis rectis retrorsum leviter productis; elytris sub-seriatim punctulatis, interstitiis alternis fulvo-pubescentibus. Long., $2\frac{3}{5}$ l.; lat., $1\frac{3}{5}$ l. (vix).

grees with *Soronia* in all generic characters, I think,—elytra

almost entirely covering the pygidium, labrum well develop emarginate, prothorax not overlapping the base of the elyt prosternum not prolonged in a free process behind the anter coxæ, tarsi simple, apex of mandibles bidentate.

Of the previously described Australian *Sorontæ*, I have seen *S. superba*, Reitt., but from the description it is obvi that it is very different from this species—with conspicu markings on the upper surface; *S. variegata*, Macl., is stated Mr. Olliffe (from examination of the type) to be a *Neasp S. amphotiformis*, Reitt., is a very different insect, with v much wider lateral margins, markings on the elytra, &c., &c.

Compared with the European *S. punctatissima*, Ill., the pres species (apart from colour and markings) is less elongate, w lateral margins much narrower, anterior angles of prothor much less produced, surface of prothorax without inequaliti puncturation of upper surface much more distinct and subru lose, seriate pubescence of elytra very conspicuous, puncturat of under surface much coarser, &c., &c.

The colour and markings are much like those of several A tralian *Nitidulidæ* of other genera, *e.g.*, *Lasiodactylus marginat* Reitt.

Victoria; Alpine district.

LASIODACTYLUS.

L. marginatus, Reitt. (var. ? *obscurus*). Nigro-piceus vel pic rufescens; antennis (nonnullis exemplis clava picea) pedi et corpore subtus rufis, nonnullis exemplis prothoracis late bus dilutioribus; supra fortiter sat crebre punctulatus; p thorace quam longiori vix duplo latiori, antrorsum sat ang tato, antice leviter emarginato, angulis posticis rotunda obtusis; elytris subseriatim punctulatis, interstitiis alter seriatim setulosis; tibiis anticis apice extus dente curv productis. Long., $1\frac{4}{5}$ l.—$2\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.—$1\frac{2}{5}$ l.

I have not seen a typical example of *L. marginatus*, Reitt., b the specimens before me agree fairly well with the descripti except in respect of colour. As I have seen a good many spe mens, the variety seems to be deserving of a name, even if it only a var.

I have described it sufficiently fully to characterise it as species if it prove to be distinct from *L. marginatus*, as the d cription of the latter is wanting in detail—the puncturation, instance, merely being called "close, and on the elytra irregula seriate," without any indication whether it is fine or coarse. do not know any familiar Australian *Nitidulidæ* with which t puncturation of the present form can be profitably compared. is not unlike the prothoracic puncturation of *Macroura decept*

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kb., but this information will not be of much value to most
opterists; it is, however, in character very similar to the
turation of the common European *Ips ferrugineus*, Fab., but
ry much closer, the whole upper surface being quite as closely
tured as the *head* of *Ips ferrugineus*.
ie "intermediate plate" on the under surface is moderately
, and is equilaterally triangular in shape.
ieensland.

IDÆTHINA.

ie following species is so near absolute agreement with Herr
ter's characters for this genus that I do not think it would
esirable to give it a new generic name merely on the ground
me slight discrepancies. These are that the mesosternum is
"scarcely," but) *not* carinate, and that the prosternum is not
nged behind the front coxæ in a distinct process. The
ture of the prosternum is not mentioned in Herr Reitter's
nosis of the genus, but from its being placed near *Æthina*
Lasiodactylus the presence may be inferred of at least the
all pin-point-like process" attributed to those two. This,
ver, I have not been able to detect in the example before
he prosternum being bent down behind the anterior coxæ
st exactly as in *Soronia*. It is possible, however, that this
be the case in *Idæthina*, as otherwise it is difficult to under-
d why its author has separated it from *Lasiodactylus*, as all
haracters given are also attributed to *Lasiodactylus*, except
labrum being very short, and this latter character seems a
feeble one on which to found a genus. The claws of *Idæthina*
aid to be "simple;" the claws of the specimen before me are
inly not dentate, but they are slightly dilated at the base—
however, to an extent that seems inconsistent with their
called simple. It is possible that Herr Reitter, if he saw
insect, would give it a new generic name. I may add that
yes of this insect are more strongly and coarsely granulate
those of any other *Nitidulid* known to me. The piece of
undersurface which I have called the "intermediate plate"
p. 102) is very large and well defined, almost as in
gethes.

ncta, sp. nov. Late subcylindrica; subnitida; sat longe
fulvo-pubescens; rufus, prothoracis et elytrorum singulorum
disco infuscato; prothoracis elytrorumque marginibus et
tibiarum posteriorum 4 marginibus externis dense ciliatis;
prothorace quam longiori fere duplo latiori, minus subtiliter
sat crebre subrugulose punctulato, antrorsum fortiter an-
gustato, antice emarginato, angulis posticis rectis, lateribus
anguste marginatis; elytris postice singulatim late rotundatis
pygidii dense pubescentis basin tegentibus, seriatim pube-

scentibus, leviter striatis, striis minus subtiliter punctul
apicem versus vix profundioribus, interstitiis vix perspi
punctulatis; corpore subtus leviter sat crasse punctul
Long., 2 l.; lat., 1 l.

Besides difference in colour, this species seems to differ fr
I. Deyrollei, Reitter, *inter alia*, by its striate elytra and m
strongly punctulate prothorax.

S. Australia; taken by Mr. McDougall near Victor Harbou

MACROURA.

Of this genus I have three species before me. One of t
(from Western Australia and the Port Lincoln district of So
Australia) is, I think, *M. brunnescens*, Reitt., the exact hab
of which has not, so far as I can ascertain, been previously
corded. It agrees with the description in every respect, exc
that the author does not mention the sutural angles of the ely
being rounded off so as to show a small piece of the propygidi
In his description of the Indian *M. meligethoides*, Herr Rei
mentions the presence of this character, and therefore his omis
to mention it in describing *M. brunnescens* seems to imply
absence, but in all other respects the insect agrees so well v
the description that I think the omission is probably accident

M. deceptor, sp. nov. Late ovalis; vix nitida; aureo-pubesce
piceo-nigra, labro ore antennis pedibus elytrorumque a
summo rufis; prothorace quam longiori duplo latiori, ant
sum sat angustato, antice leviter emarginato, fortiter
crebre punctulato, angulis posticis rectis retrorsum sat
ductis; elytris apice singulatim rotundatis (propygidium
medio aperientibus), sat fortiter vix regulariter stri
interstitiis ruguloso-punctulatis et seriatim minus perspi
aureo-pubescentibus; pygidio ruguloso. Long., $1\frac{3}{4}$
lat., $\frac{4}{5}$ l.

Remarkably like a large *Meligethes;* the very strong and
very close puncturation of the prothorax, separately rounded
truncate) apices of the elytra, the red apex of the elytra and
red antennæ will in combination distinguish this species from
its described congeners.

Northern Territory of South Australia.

M. Baileyi, sp. nov. Late ovalis; subnitida; aureo-pubesce
atra, antennarum basi pedibusque rufescentibus; protho
quam longiori duplo latiori, antrorsum fortiter angust
antice bisinuato, crebre sat fortiter punctulato, angulis
ticis rectis retrorsum sat productis; elytris apice singula
late rotundatis (propygidium in medio aperientibus), sat
titer sat regulariter striatis, interstitiis rugulosis et seria
aureo-pubescentibus; pygidio reguloso. Long., $1\frac{3}{5}$ l.; lat.

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esembles the preceding species, but differs in colour and in evidently closer and less strong puncturation of the prothorax, h is about as strong as (and somewhat closer than) that of prothorax of the European *Brachypterus urticæ*, Fab. Of the iously described species *M. brunnescens*, Reitt., and *nigra*, t., are considerably larger, the former (as also *M. densita*, t,) having the prothorax very much more finely punctured, the latter—besides having the prothorax more finely punc- d (as I should judge from the description)—having black scence and elytra truncate at the apex.

ueensland; taken on Mount Bellenden-Ker by F. M. Bailey, (of botanical fame).

ÆTHINODES (gen. nov. *Nitidulidarum*).

rum transversum emarginatum; antennarum clava magna fortiter compressa, articulis fortiter transversis; oculi parvi fortiter prominentes fortiter granulati; prothorax elytrorum basin haud tegens; elytra pygidium fere totum tegentia; prosternum pone coxas breviter productum et abrupte in apicem acutum retrorsum angustatum; tarsi modice dilatati; unguiculi basi dente obtuso armati; corpus ovale pubescens; mesosternum carinatum.

cannot ascertain that any genus has been described hitherto hich an insect presenting the above characters could be re- d without a likelihood of causing confusion, and therefore I bliged to give a new name.

ne piece of the undersurface which I have called the "inter- iate plate" is very distinct; it is narrow and elongate, much n *Gaulodes*, and not unlike the corresponding piece in *Ips*. er characters that seem likely to be generic are great elonga- of the third joint of the antennæ, as compared with the fol- ng joints, and the disappearance of the third and fifth rows ubescence on the elytra considerably before the apex.

think the position of this genus will be near *Lasiodactylus Æthina*, which have a very similar prosternal process— d immediately behind the coxæ, and then narrowed to an al angle very abruptly, so that the part behind the coxæ is gular, and yet very short. I have not been able to examine mandibles. The tarsi are dilated a little more strongly than *Amphotis*. The eyes resemble those of the European *ramus luteus*, Kug., but are smaller, and even more promin-

marmoratum, sp. nov. Late ovale, postice sat angustatum; sat nitidum; pubescens; rufo-ferrugineum, prothorace elytrisque maculatim infuscatis; prothorace quam longiori duplo latiori, minus subtiliter minus crebre punctulato,

antrorsum sat fortiter angustato, antice emarginato, ang
posticis acute rectis retrorsum subproductis, lateribus mi
anguste reflexo-marginatis ; elytris postice singulatim rot
datis, fere ut prothorax punctulatis (sed puncturis subse
tim dispositis), seriatim pubescentibus, apicem ver
seriebus 1ª 2ª 4ª que in carinis elevatis, 3ª 5ª que obsol
Long., 1⅛ l. ; lat., 1 l.

Besides the apical part of the first, second, and fourth row
pubescence, the parts of the sixth and seventh immediately
hind the middle seem to be a little elevated.

In the example before me the infuscation on the disc of
prothorax is blotchy and very ill-defined, while that on the ely
is very distinct, consisting of a large common basal triangle ar
number of small spots, the largest of which are on either side
the suture near the apex.

Tropical Australia ; I am not sure of the exact locality.

THALYCRODES (gen. nov. *Nitidulidarum*).

Labrum bilobum ; antennarum clava ut *Thalycræ* ; oculi
magni sat prominentes modice granulati ; protho
elytrorum basin haud tegens ; elytra pygidii partem tegen
prosternum ut *Lasiodactyli* ; mesosternum subtiliter car
tum ; tibiæ omnes extus dentibus spinulisque arma
tarsi simplices ; unguiculi basi vix compresso-dilat
corpus pubescens, marginibus dense ciliatis.

The species for which I propose this name cannot be refer
to *Thalycra*, on account of their having all their tibiæ stron
armed externally, the claws not truly simple, and the mesosterı
traversed longitudinally by an extremely fine elevated line.
cannot help thinking that *Thalycra australis*, Germ., is congen
with the species before me, and that its author overlooked
extremely fine carina on the mesosternum—indeed, I should h
no hesitation whatever in considering one of the insects bef
me as identical with it specifically if it were not for this d
culty. I have therefore given it the name *australe*, as I
satisfied that, if generically, it is also specifically identical.

The "intermediate plate" on the undersurface of this genu
decidedly large, and forms a triangle. The third joint of
antennæ is, as in *Ethinodes*, longer than the next two toget
Unfortunately, I have not been able to compare these spe
with a specimen of *Thalycra*, and have had to depend u
descriptions of that genus, aided by my memory of it, in mak
the preceding remarks.

T. australe (? Germ.). Ovale ; convexum ; sat nitidum ; pu
scens ; ferrugineo-brunneum (elytris nonnullis exemplis
scure testaceo-maculatis); prothorace quam longiori du

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latiori, minus subtiliter minus crebre punctulato, antrorsum sat fortiter angustato, antice emarginato, angulis posticis rotundatis lateribus anguste marginatis; elytris postice rotundato-truncatis, vix striatis, striis crebre punctulatis, interstitiis vix punctulatis alternis griseo-pilosis.

r. *tenebrosum;* corpore et antennarum clava nigrescentibus, elytris manifeste testaceo-maculatis. Long., $1\frac{1}{4}$—$1\frac{1}{2}$ l.; lat., $\frac{3}{5}$—$\frac{4}{5}$ l.

e front tibiæ have three blunt teeth placed round the apical nal margin; the intermediate tibiæ have their external in finely spined in its whole length, and there is a large bifid a little before the apex, and a simple sharp one still nearer ne apex; the external margin of the hind tibiæ is finely d in all its length, and bears close to its apex a long tooth h ends in two spines. The "intermediate plate" is in the of an equilateral triangle, and is of large size.

e pale markings on the elytra consist of three or four large placed at intervals on either side of the suture in the rior two-thirds of its length, and an additional spot on the at the shoulder. In ordinary specimens they are scarcely, ot at all, noticeable; in the var. *tenebrosum*, they are very picuous.

Australia; near Adelaide, also near Port Lincoln.

ulchrum, sp. nov. Ovale; convexum; pubescens; ferrugineum, elytris notis infuscatis numerosis maculatis; prothorace quam longiori duplo latiori, minus subtiliter sat sparsim punctulato, antrorsum sat fortiter angustato, antice emarginato, angulis posticis bene determinatis obtusis, lateribus anguste marginatis; elytris postice rotundato-truncatis, leviter striatis, striis crebre punctulatis, interstitiis vix punctulatis alternis griseo-pilosis. Long., $1\frac{3}{5}$ l. (vix); lat., $\frac{3}{5}$ l.

ne front tibiæ are strongly crenulate all along their external and have two strong sharp teeth, one at the apex, the immediately before it; the middle and hind tibiæ are feebly widely serrate externally, and also bear a series of strong es, their apex being dilated externally into a kind of blunt n, on which are several longer spines. The dark markings ne elytra are very distinct and very intricate. The suture is scate, a series of spots forms a kind of festoon from shoulder oulder, crossing the suture at about a-third of its length the base, and on either side sends a branch forward to the from the middle of its length between shoulder and suture, ral spots placed transversely occupy the middle part of each on, and the apex is edged with dark-brown, which is coned on either side and then arched forward to the suture so as

to form a ring intersected by the dark suture on either si which it thus encloses a patch of the pale ferruginous g colour. The "intermediate plate" is in the form of an lateral triangle, but is much smaller than in the prec species.

S. Australia; near Port Lincoln.

T. cylindricum, sp. nov. Sat elongatum; subparallelum; cylindricum; piceo-nigrum, capite prothoraceque ol rufescentibus; antennis (clava excepta) pedibus et elytr maculis nonnullis rufis; prothorace quam longiori di latiori, vix subcanaliculato, crebre minus subtiliter subs punctulato, antrorsum minus angustato, antice l emarginato, angulis posticis rotundato-obtusis, lateribu anguste marginatis; elytris postice rotundato-trun leviter striatis, striis crebre punctulatis, interstitiis sub losis, alternis griseo-pilosis; oculis minus fortiter granu Long., $1\frac{2}{5}$ l.; lat., $\frac{3}{5}$ l.

Although the subcylindric form and less strongly granu eyes of this insect suggest considerable doubt as to whether rightly placed here, I cannot regard those characters as suf foundation for a new genus. The 3rd joint of the antenna little less elongate than in the preceding two species, and o under surface the "intermediate plate" is considerably nar and elongated; the other structural characters seem ider The red blotches on the elytra are not very strongly d (having somewhat the appearance of being marked on the surface of the elytra, and seen through its substance)—but l no doubt their brightness is variable. They are very simil those in some examples of *T. australe*.

The front tibiæ are very like those of *T. pulchrum*, but crenulations are feebler and they have only a single blunt tooth at the apex; the middle and hind tibiæ are spine ternally, and have a bifid tooth close to the apex.

Victoria; in the Alpine district.

TROGOSITIDÆ.

NEASPIS.

N. pusilla, sp. nov. Elongato-ovalis; sat nitida; setulis a confuse vestita; picea, antennis basin versus proth elytrorumque lateribus corpore subtus et pedibus plus r rufescentibus; capite prothoraceque crebre obscure sub lose punctulatis; hoc quam longiori plus duplo l antrorsum leviter angustato antice leviter emarginato, a posticis subrectis retrorsum subproductis, lateribus late ginatis ciliatis subtiliter serratis; elytris sat crasse sub

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lose subseriatim punctulatis lateribus subtiliter ciliatis. Long., 1½ l.; lat., ⅔ l. (vix).

Very like the common *N. variegata*, Macl., but *inter alia* without any pattern on the elytra, much smaller, more elongate, with the prothorax more transverse and less emarginate in front, with the anterior angles scarcely at all produced, and having its lateral margins finely serrate.

South Australia; near Adelaide.

PELTONYXA.

I have before me two species evidently belonging, I think, to this genus, but I cannot identify either of them with the previously recorded *P. Deyrollei*, Reitt., which is a much larger insect, besides differing in several other particulars.

australis, sp. nov. Elongata, postice leviter dilatata, minus convexa; vix pubescens; ferruginea, elytris dilutioribus, prothoracis disco utrinque (nonnullis exemplis) nigro-umbrato; capite prothoraceque opacis confertim subtilissime punctulatis; hoc quam longiori duplo latiori, antrorsum parum angustato, lateribus minus rotundatis minus late reflexis, angulis posticis rotundato-obtusis; elytris fortiter seriatim punctulatis, interstitiis alternis vix elevatis. Long., 1⅓ l.; lat., ⅔ l.

South Australia; Adelaide district.

pubescens, sp. nov. Elongata, postice leviter dilatata, minus convexa; pilis erectis sat elongatis vestita; nigro-brunnea, antennis pedibus et prothoracis elytrorumque lateribus testaceis; capite prothoraceque subtiliter rugulosis; hoc quam longiori duplo latiori, antrorsum parum angustato, lateribus minus rotundatis sat anguste reflexis, angulis posticis rotundato-obtusis; elytris fortiter rugulose subseriatim punctulatis. Long., 1⅔ l.; lat., ⅔ l.

Victoria; under bark of Eucalyptus in the Alpine district.

COLYDIIDÆ.

The determination of the question whether a given insect should be referred to this family or to the *Tenebrionidæ* seems liable of depending merely on the existence or non-existence of the minute basal joint of the anterior four tarsi. *Byrsax*, for instance, was originally placed in the *Colydiidæ* as having tetramerous tarsi, and some years later its author, Mr. Pascoe, reported having discovered it to be heteromerous, and so transferred it to the *Tenebrionidæ*. I draw attention to the close analogy (even if it be no more) between these families, because I have several new species before me for description, which I refer to the

Colydiidæ, but with a doubt whether they may not possess—*Byrsax* is said to do—"a basal (tarsal) joint completely hidden the cotyloid cavity of the tibia," which I have failed to discov

DITOMA.

D. pulchra, Blackb. In the Alpine district of Victoria I ha met with some examples of an insect which appear to be scarc specifically distinct from this S. Australian species, although th are smaller and darker than the type. They vary a little in t prominence of the lateral dilatation of the prothorax, and I a not quite sure that they do not represent a distinct species, but cannot find any invariable character by which to distingui them. This insect bears a very remarkable general resemblan to *Sparactus interruptus*, Er.

D. torrida, sp. nov. Minus depressa; minus nitida; glabr ferruginea; capite postice prothoracis disco et elytrorı maculis numerosis (his fascias 4 irregulares formantibı obscure fuscis; prothorace granulato, utrinque bicostato inter costas internas basin versus carinis 2 arcuatis instrı tis, costis et marginibus lateralibus (his late reflexis) sı tiliter crenulatis, angulis omnibus acutis; elytris singu carinis 5 valde elevatis instructis, interstitiis crasse biser tim punctulatis. Long., $2\frac{1}{3}$ l. (vix); lat., $\frac{1}{5}$ l.

This species must be near *D. serricollis*, Pasc.; in that speci however, *inter alia*, the upper surface appears to be of a unifor dark-brown colour—the prothorax to be simply bicostate either side instead of having a short arched additional cos looped on to each of the inner costæ near the base—and the he to be trilobed in front, whereas the head of the present species rotundate-truncate in front, very much as that of the Europe *D. crenata*.

N. Queensland; in the collection of C. French, Esq.

D. nivicola, sp. nov. Minus depressa; subnitida; setis suber tis minus crebre vestita; brunneo-nigra; antennis, cap antice, prothoracis lateribus, elytrorum maculis parvis nı nullis (his testaceo-pubescentibus) et pedibus, rufis; cap prothoraceque crebre granulosis; hoc minus inæquali, late bus fortiter serratis a basi antrorsum gradatim ma fortiter dilatatis antice valde productis; elytris striatis cra subseriatim rugulose punctulatis. Long., $1\frac{3}{5}$ l.; lat., $\frac{3}{5}$ l. (vi

The colours and markings of this species are much like those *D. hilaris*, Blackb., but the latter is a considerably narrower a more elongate insect, with the prothorax much less dilat laterally, the elytra less coarsely sculptured, &c.

Victoria; Alpine district, under the bark of a *Eucalyp* standing in a snowdrift.

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SARROTRIUM.

australe, sp. nov. Elongatum; nigrum; antennis squamis griseo-ferrugineis vestitis, pedibus ferrugineis, elytris fasciis 2 rufis ornatis; capite utrinque pone oculos spina armato; prothorace antrorsum angustato, angulis anticis lateraliter subspinosis; elytris profunde punctulato-striatis, longitudinaliter 3-costatis, costis externis pone medium sinuatis. Long., 2 l.; lat., $\frac{3}{5}$ l. (vix).

everal genera of *Tenebrionidæ (e.g., Elascus)* have been described, the remarkable similarity of which to *Colydiid* genera been remarked on. I at first supposed this present species ertain to one of them, but on careful examination I find that oes not; with the aid of a compound microscope I feel sure t it is not heteromerous; it can be so only if there is a very ute basal joint of the anterior tarsi so imbedded in the coty- cavity of the tibia as to be discoverable only by dissection, ch I have not been able to employ, having only a single mple. The fasciæ on its elytra are of a bright red colour; of them commences a little behind the shoulder on the margin runs obliquely to the suture a little in front of the middle, other being subapical and straight. The short lateral spine which the antennal orbit is drawn out behind the eye is a y distinctive character. The head and prothorax are extremely those of *Sarrotrium clavicorne*, and the antennæ are almost ctly like the antennæ of that species, though a little less stout. t may be remarked that the specimen before me is in its ıctural characters extremely like the figure of *Latometus escens*, Er. (Wiegm. Arch., 1842, I., tab. 5, fig. 3); it is, however, evidently much narrower and more elongate, and moreover figure represents *Latometus* as having all the five joints of anterior four tarsi quite well defined.

Victoria; in the Alpine district.

MERYX.

æqualis, sp. nov. Elongata; parallela; supra æqualis; subnitida; subreticulatim albido-pubescens; capite prothoraceque confertim subtiliter punctulatis; hoc postice minus angustato, lateribus crenulatis; elytris sat fortiter vix seriatim punctulatis, vix manifeste 3-costatis; antennarum articulis ultimis 2 quam 9^{us} nonnihil brevioribus; palporum maxillarum articulo ultimo apice oblique truncato. Long., $3\frac{1}{8}$—4 l.; lat., 1—$1\frac{1}{8}$ l.

The whitish pubescence is very inconspicuous on the prothorax; the elytra it is very distinct, but not very sharply limited; it ns a reticulated pattern somewhat like the reticulation formed the previously described species by costæ. Compared with

M. illota, Pasc., the present species is less opaque, its prothora is less narrowed behind, and its antennæ are longer, more slende and less incrassate towards the apex, with the apical two joint distinctly though not much shorter than the preceding joints the last joint of the maxillary palpi is a little more sharply tr angular than in *M. illota*.

South Australia; near Port Lincoln, under bark.

SPARACTUS.

This genus is remarkably like *Ditoma* superficially, but may b at once distinguished by the 3-jointed club of its antennæ. A species occurring not uncommonly in S. Australia and Victori agrees very well with the description of *S. interruptus*, Er., th only species named up to the present time. The following seer to be new :—

S. pustulosus, sp. nov. Opacus; niger, antennis pedibus pro thoracis lateribus elytrorum basi et corpore subtus obscur rufescentibus; supra granulatus; capite angulos 4, pro thorace processus serratos 3, utrinque formantibus; horun antico permagno antrorsum curvato-producto; prothorac supra tuberculis conicis instructo; elytris 3-seriatim tuber culatis. Long., 2 l.; lat., $\frac{4}{5}$ l.

S. Australia; common under bark of Eucalyptus in variou localities.

S. elongatus, sp. nov. Opacus; niger, antennis pedibus capit antice prothoracis lateribus et corpore subtus rufescentibus supra granulatus; capite quadrato, antice rotundato-trun cato, lateribus reflexis; prothorace antice fortiter bisinuato lateribus leviter sinuatis late reflexis crenulatis, disc tuberculis parvis nonnullis instructo; elytris obscure 3-seria tim tuberculatis. Long., $2\frac{1}{3}$ l.; lat., 1 l. (vix).

S. Australia; Port Lincoln district.

S. proximus, sp. nov. Opacus; niger, capite antice antenni pedibusque rufescentibus; supra granulatus; capite fere u *S. interrupti*, Er., sed angulis subanticis rotundatis; pro thorace inæquali, antice dilatato, margine crenulato; elytri 3-costatis, costis interioribus interruptis. Long., $1\frac{3}{5}$ l.; lat. $\frac{3}{5}$ l. (vix).

Very like *S. interruptus*, Er., but differently coloured and sculptured, the upper surface (except the reddish front of th head) being unicolorous; the inner two costæ on each elytror being less frequently, and less widely, interrupted (so that they appear much less like a series of tubercles); and the hinder o the two angles of the sides of the head being quite rounded off In both these species the upper surface of the head is flattish and

e or less quadrate, but very close to its front margin is sud-
ly contracted into an extremely short parallel-sided prolonga-
; in both, the sides and front of this terminal piece meet in
rp angles, and in *S. interruptus* there is also a well-defined
le at the point where the head is contracted, while in
roximus this part is rounded off.
. Australia; near Adelaide.

ostatus, sp. nov. Opacus; niger, pedibus plus minus piceis,
antennis tarsis et corpore subtus obscure rufescentibus;
supra granulatus; capite prothoraceque fere ut *S. interrupti;*
elytris 3-costatis, costis haud interruptis. Long., $1\frac{1}{5}$—$1\frac{3}{5}$ l.;
lat., $\frac{3}{5}$—$\frac{3}{6}$ l.

. Australia; widely distributed, and not rare.

he following is a tabulation of the described species of
ractus:—

Elytra with all their costæ entire ...	costatus, Blackb.
. The inner two costæ interrupted.	
B. The subapical angles of the head rounded...	proximus, Blackb.
BB. The subapical angles of the head well defined	interruptus, Er.
A. All the costæ broken up into tubercles.	
B. Prothorax simply sinuate in lateral outline	elongatus, Blackb.
BB. Lateral margin of prothorax cut into large and conspicuous processes	pustulosus, Blackb.

BOTHRIDERES.

Victoriensis, sp. nov. Nitidus; prothorace fortiter punctulato,
disco late depresso, medio vix elevato; niger; antennis pedi-
busque piceo-rufis, elytris fulvo-castaneis; his striatis, inter-
stitiis subconvexis obscure punctulatis inter se æqualibus.
Long., 2 l.; lat., $\frac{3}{5}$ l.

ery like the common *B. vittatus*, Newm. Compared with it,
head does not differ noticeably—the prothorax is a little more
gate (being quite as long as wide) with the discal impression
marked—the elytra have not the sutural dark stripe, and
r interstices are very different (the second being as wide as
first and third, and all of them being slightly convex). I do
think this species can be identical with *B. musivus*, Pasc.,
ch, however, it, perhaps, somewhat approaches; its colour
ıs to be very different, and also I cannot find any elytral
pture agreeing with that attributed to *B. musivus*, which is
to have "three lateral alternate interstices costæform."
ictoria; Alpine district.

B. merus, Pasc. This species is not very intelligibly describe In the author's tabulation of the genus it is placed as "su opaque," but in the description it is called "subnitid." It further distinguished from *B. musivus* by several characters, a it is added, "in both the elytra are less deeply striated," sugge ing the enquiry, "less deeply than what?" Perhaps words m have been omitted by a printer's error.

I have before me a species which occurs not uncommonly und bark of *Eucalyptus* in the Alpine district of Victoria, which, think, is probably *B. merus*; it is a trifle less nitid than is usu in the genus, and seems to agree with Mr. Pascoe's descriptio such as it is. The longitudinal convexity down the centre of t depressed space on the prothorax is, however, a little better d fined than the description would lead one to expect. It is r markable for its very small narrow head, a character not referr to by the author of *B. merus*. It has the third elytral intersti much narrower than either the second or fourth, a charact which at once distinguishes it from *B. Victoriensis*. Of the oth species having prothoracic sculpture of similar character, *musiv* Pasc., seems to be larger, and to have "three lateral alterna interstices costæform" (*sic*); *costatus*, Blackb., has elytra ve differently sculptured; *vittatus*, Newm., has a much wider hea different colours, &c.

CUCUJIDÆ.

SILVANUS.

S. armatulus, sp. nov. Minus elongatus; sat convexus; pub cens; ferrugineus; prothorace quam longiori vix latio crebre subtiliter rugulose punctulato, supra æquali, lateri fortiter 6-dentatis; elytris punctulato-striatis. Long., 1 lat., $\frac{3}{10}$ l.

Not unlike *S. advena*, Kunz, in outline and convexity, b with the prothorax more elongate, narrower (especially behin and armed at the sides with six strong teeth.

Victoria; Alpine district.

S. monticola, sp. nov. Sat elongatus; sat convexus; pubescen ferrugineus; capite prothoraceque obscuris; hoc quam longi haud latiori, confertim subtiliter vix rugulose punctulat supra æquali, lateribus subrectis subtiliter sat crebre de ticulatis, ad angulos anticos dente majori instructis; elyt punctulato-striatis. Long., 1 l.; lat., $\frac{3}{10}$ l. (vix).

Very like the preceding species, but narrower and more el gate, with the sides of the prothorax very differently sculptured

Victoria; under bark of *Eucalyptus* in the Alpine district.

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CRYPTOPHAGIDÆ.

CRYPTOPHAGUS.

Lindensis, sp. nov. Oblongo-ovalis; sat convexus; ferrugineus; pube fulva minus brevi vestitus; prothorace transverso, confertim sat fortiter rugulose fere confluenter punctulato, supra æquali (nihilominus trans basin depresso), lateribus ante medium leviter rotundato-dilatato; antennarum clava 3-articulata, articulis minus fortiter transversis. Long., 1 l. (vix); lat., $\frac{3}{10}$ l.

This little species seems to be a true *Cryptophagus*, and I cannot ntify it with any described species, though it is, I think, rather e to *C. pubescens*, Sturm., but *inter alia* it has no trace whatr of the angular dilatation which that species presents in the dle of the lateral margin of its prothorax.

Compared with *C. affinis*, Sturm. (the only species of the genus viously recorded as found in Australia), the present insect is siderably smaller and narrower; its puncturation is markedly er on the prothorax, and a little less close on the elytra; the s of its prothorax are straight and parallel from the base to ond the middle, their front part having the lateral strongly gined dilatation so characteristic of *Cryptophagus*, but this is quite so strong as in *C. affinis;* the antennæ are not quite so t as in *C. affinis*, and their club is different, its joints being ut equal in width, the first and third only slightly transverse, second shorter than the other two, and moderately strongly sverse, but much less strongly so than either the first or nd in *C. affinis*.

. Australia; Port Lincoln district, under bark of *Casuarina*.

ATOMARIA.

lthough I cannot find that any Australian species of this us have been described, the genus is well represented in Aus-ia. The following are among the species in my collection :—

ustralis, sp. nov. Ovalis; convexa; pubescens; sat fortiter sat crebre æqualiter punctulata; subtus nigra, supra ferruginea; elytris pone medium nigro-fasciatis, antennis pedibus que rufescentibus; prothorace transverso subquadrato, basi haud marginato, ante basin utrinque fovea profunda rotundata impresso; antennis basi sat distantibus. Long., 1 l.; lat., $\frac{2}{5}$ l.

outh Australia; widely distributed.

Lindensis, sp. nov. Oblonga; sat convexa; pubescens; rufoferruginea, capite prothoraceque piceis; minus fortiter punctulata; prothorace elytris sat angustiori, subquadrato, basi haud marginato, ante basin utrinque fovea obsoleta rotundata

impresso, minus crebre punctulato; elytris sat crebre pun
tulatis; antennis basi sat distantibus. Long,, 1 l.; lat., $\frac{3}{1}$
Var. capite prothoraceque ferrugineis.

This species is very like the European *A. badia*, Er., fro
which it differs in its antennæ less approximate at their base, t
prothorax not so much narrower than the base of the elytra, a
the puncturation of the elytra considerably closer and finer.

South Australia; Port Lincoln district; among fallen leaves

LATHRIDIIDÆ.

CORTICARIA.

C. australis, sp. nov. Oblonga; convexa; sat nitida; sat den
(in elytris lineatim) pubescens; fusco-brunnea; antenn
(clava excepta) pedibusque dilutioribus; capite prothora
parum angustiori; oculis magnis prominulis; prothora
leviter transverso, crebre sat fortiter (æque ut caput) pun
tulato, ante basin sat profunde arcuatim impresso, impr
sione in medio leviter foveata, angulis posticis rotunda
obtusis; elytris quam prothorax vix fere duplo latioribu
vix striatis, puncturarum sat magnarum seriebus creb
instructis, his apicem versus vix obsoletioribus. Long., $\frac{4}{5}$
lat., $\frac{3}{10}$ l.

Very like the European *C. gibbosa*, Herbst., differing chie
by the presence of a well-defined round fovea in the middle of t
transverse sulcus on the prothorax, and by the closer rows
punctures on the elytra, which are not placed in distinct stri
and between which the interstices are perfectly flat throughou

S. Australia and Victoria.

C. Adelaidæ, sp. nov. Oblongo-elongata; sat nitida; sat den
(in elytris lineatim) pubescens; testaceo-brunnea; ante
narum clava picea; capite prothorace sat angustiori; ocu
sat magnis sat prominulis; prothorace sat fortiter tra
verso, crebre subtilius punctulato, ante basin fovea rotun
instructo, angulis posticis bene determinatis, elytris qua
prothorax sat latioribus, subtiliter striatis, striis crebre su
tiliter punctulatis, sculptura apicem versus vix obsoletio
Long., $\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l.

Resembles the European *C. elongata*, Gyll., differing chiefly
the piceous club of its antennæ, its more strongly punctulate p
thorax, the perfectly flat interstices of its elytra, and its son
what less parallel form.

S. Australia; widely distributed.

C. Lindensis, sp. nov. Breviter ovalis; sat nitida; sat dense
elytris lineatim) pubescens; rufo-testacea; antennis apice
versus obscurioribus; capite quam prothorax parum angu

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tiori; oculis sat magnis sat prominulis; prothorace fortiter transverso, crebre fortius subrugulose punctulato, ante basin sat profunde arcuatim impresso, impressione in medio foveata, angulis posticis obtusis; elytris prothorace fere duplo latioribus, striatis, striis puncturis sat magnis instructis, apicem versus vix obsoletis. Long., $\frac{1}{10}$ l.; lat., $\frac{3}{10}$ l.

his species is of the short broad form of *C. curta*, Woll., ch it resembles also in respect of sculpture, differing, however, he strongly marked transverse furrow of its prothorax; its pture is much stronger and coarser than those of the two spe- described above.

Australia; Port Lincoln district.

ndersoni, sp. nov. Oblongo-elongata; sat nitida; sat dense (in elytris lineatim) pubescens; supra testaceo-brunnea, subtus piceo ferruginea; capite prothorace parum angustiori, oculis sat magnis sat prominulis; prothorace leviter transverso, minus crebre profunde nec subtiliter punctulato, ante basin transversim arcuatim sulcato, angulis posticis rotundatis; elytris prothorace duplo latioribus, subtilissime striatis, striis subtiliter punctulatis, sculptura apicem versus vix obsoletiori; antennis pedibusque testaceis, illarum clava vix infuscata. Long., $\frac{3}{5}$ l.; lat., $\frac{3}{10}$ l. (vix).

his minute *Corticaria* differs from all the preceding in having ry strongly marked transverse sulcus on the hind part of the horax, without any round fovea. The puncturation of the horax is also distinctive—rather coarse, but not deep, nor close.

Australia; Port Lincoln district. Named after my friend, J. Anderson, of Port Lincoln.

lutacea, sp. nov. Nigro-picea, antennarum basi pedibusque paullo dilutioribus; lineari-elongata; subdepressa; fere glabra; alutacea; capite prothoraceque parce punctulatis, hoc basin versus angustato, ante basin fovea magna profunda impresso, angulis posticis obtusis bene determinatis, lateribus minute nec crebre denticulatis; elytris pygidio haud plane tegentibus, subtilissime seriatim punctulatis, antennarum clavæ articulis brevibus. Long., $\frac{1}{3}$ l.; lat., $\frac{1}{6}$ l. (vix).

his species must be extremely close to *C. subtilissima*, Reitt., appears to differ from it in having the hind angles of the horax very well defined, and the joints of the antennal club rent, the basal two being quite strongly transverse, and the al one elongate-globose—all three of equal width *inter se*. fine denticulation of the sides of the prothorax is scarcely ceable without the use of a compound microscope.

Australia; in several localities.

MYCETOPHAGIDÆ.

TRIPHYLLUS.

T. intricatus, sp. nov. Subovalis, postice angustatus; pubescen rufo-ferrugineus; elytris 3-fasciatim nigro-notatis; p thorace fortiter transverso, antrorsum fortiter angusta confuse dupliciter punctulato, postice utrinque impres angulis posticis sat acutis; elytris leviter striatis, striis fortiter punctulatis, interstitiis vix convexis leviter crebre nec subtiliter punctulatis. Long., $1\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l. (vi

The dark markings on the elytra are intricate and a lit variable. They consist of three zig-zag fasciæ, which do usually reach the lateral margins (the intermediate fascia does in some examples), the hinder two, or even all three, being distinctly connected with each other at their lateral extremit in some examples. One of these fasciæ is basal, and is oft reduced to a mere blotch on each side the scutellum; the next median; the last is ante-apical, but in many specimens is dilat hindward so as nearly to reach the apex itself.

Victoria; a few specimens occurred in fungi on a mounta called Baldi, at an elevation of about 6,000 feet.

MYCETÆA.

M. pilosella, sp. nov. Breviter ovalis; subnitida; pilis erec sat sparsim vestita; ferruginea; prothorace crebre rugul minus subtiliter punctulato, intra marginem lateralem manifeste costato; elytris minus crebre minus forti punctulatis; antennis sat elongatis; metasterno minus bre Long., $\frac{7}{10}$ l.; lat., $\frac{3}{10}$ l.

This minute species is extremely like the European *M. hir* Marsh., superficially. It is a little more elongate and (perha consequently) its metasternum is not quite so short; its anten are a little longer; the lateral costæ of the prothorax are alm obsolete; the hind coxæ are not quite so widely separated; t puncturation of its prothorax is closer, and that of its elytra both finer and closer. At a casual glance, it might pass for small form of *M. hirta*.

S. Australia; in fungi near Port Lincoln.

DIPLOCŒLUS.

D. angustulus, sp. nov. Angustus; parallelus; ferrugineu pilis erectis vestitus; prothorace transverso, retrorsu leviter angustato, sparsim sat fortiter punctulato, utrinq intra marginem leviter bicostato; elytris punctulato-striat punctures subquadratis sat grossis; abdominis segmen basali in medio oblique bistriato; antennarum clavæ articu 1° quam 2^us^ multo angustiori. Long., 1 l.; lat., $\frac{3}{10}$ l. (vi

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elongate parallel form of this little species gives it an ap-
nce very different from that of the European *D. fagi*, Guér.,
cannot find any structural characters to prevent its being
in the same genus; at any rate, the identity of tarsal and
nal characters, the lateral sculpture of the prothorax, and
lique striæ of the basal ventral segment diverging hind-
from the middle of the front margin are points of resem-
that indicate at least very close affinity between the two
s. The two previously described Australian *Diplocœli*
s, Macl., and *piliger*, Reitter), seem to be similar in form
European species. Herr Reitter says that he has not
description of Sir W. Macleay's species, but judges it dis-
from his because the name *ovatus* would be unsuitable to
tter. On comparing the descriptions, I should deem it
le that they are identical. In both descriptions the elytra
id to be "strongly punctulate striate," and this character
from the shape of the body) will furnish a further distinc-
om the present insect, in which the elytra are very feebly
, although the punctures in the striæ are fairly large and

Australia; under bark of *Eucalyptus* in various localities.

guus, sp. nov. Minus angustus; minus parallelus; pubes-
ens; ferrugineus; prothorace postice vix angustato, sparsim
at fortiter punctulato, utrinque intra marginem sat fortiter
icostato; elytris vix striatis, striis puncturis sat magnis
ubquadratis instructis, his apicem versus obsoletescentibus;
bdominis segmento basali in medio oblique bistriato; anten-
arum clavæ articulo 1° quam 2^us^ paullo angustiori. Long.,
l.; lat., $\frac{3}{4}$ l. (vix).

s species is not at all unlike *D. fagi*, Guér., in miniature;
ers from the preceding *(D. angustulus)* in its wider and less
el form, and especially in the ninth antennal joint being (as
fagi) only moderately narrower than the tenth. *D. piliger*,
(? ovatus, Macl.)—the other described Australian species—
to have the prothorax closely punctured, the elytra differ-
coloured, &c.
th Australia; near Port Lincoln.

DERMESTIDÆ.

TROGODERMA.

Australian species have been described as members of this
—*T. riguum*, Er. (from Tasmania), and *T. apicipenne*,
r (from "Australia"). The former I am fairly sure that I
ot seen, the latter I think I have taken on several occa-
As, however, I am a little doubtful about my identification
correct, it will be wiser not to refer further to Herr Reit-

ter's species beyond saying that the insect which I take to b
is very distinct from all the following, which appear to be new

T. Eyrense, sp. nov. Ovale (feminis subparallelis); obs
nigro- et fulvo-hirtum; nigrum, antennarum articulis
tibiis tarsis et elytrorum lateribus apiceque plus minus ru
centibus; obscure sat crebre punctulatum; sulcis an
nariis profundis bene determinatis, triangularibus, pos
clausis.

Mas. Antennarum clava 5-articulata, quam articuli
conjuncti multo longiori; horum articulis 2-5 minutis æqu
bus, 6° quam 5^{us} paullo longiori et sat latiori; clava cy
drica, hujus articulo 1° quam sequentes multo breviori, 2
sat æqualibus, 5° acuminato quam 3^{us} 4^{us} que conjuncti
breviori; antennis quam prothorax vix brevioribus.

Femina. Antennis paullo brevioribus; clava quam stipes
longiori, illius articulo ultimo quam præcedens paullo long
Long., $1\frac{3}{5}$—$1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.—1 l.

It should be noted that the sixth joint of the antennæ is so
termediate in width between the fifth and seventh that it m
almost as well be classed with the club (making it six-jointed
with the stipes. I have reckoned it as belonging to the la
because its *length* is perhaps more harmonious with that assc
tion. There is not any *very great* difference between the ante
of the male and those of the female; in the latter, however,
club being evidently shorter than in the former, and especi
the last joint being shorter as compared with the preceding joi
The pilosity of the upper surface is fairly dense and consist
black and greyish or fulvous hairs intermingled.

South Australia; basin of Lake Eyre.

T. alpicola, sp. nov. Ovale; obscure nigro- et griseo-hirtu
nigrum, antennarum articulis 2-6 (vel 3-6) tarsis et elytro
apice rufis; obscure minus crebre punctulatum; sulcis an
nariis profundis bene determinatis, triangularibus, pos
clausis.

Femina (?). Antennarum clava 5-articulata, quam articuli
conjuncti haud longiori, articulis 3-6 parvis æqualibus, cl
ovali, hujus articulis 1-3 ex ordine latioribus, 4° 3° æqual
quam 4^{us} paullo longiori sat angustiori; antennis qu
prothorax sat brevioribus. Long., $1\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l.

Although I think the specimens before me are females, I h
no hesitation in describing this species, since the differences
tween the male and female are but slight in all the species kn
to me that are closely allied to the present one, consisting chi
in the females being larger than the males, and having the ap
joint of the antennæ—or the whole club of the antennæ—so

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shorter. Apart from the antennal difference, this insect is emely close to the preceding, and I do not see much other dision save in the puncturation being less close, and the tibiæ st as obscure in colour as the femora.
ictoria ; Alpine district.

delaidæ, sp. nov. Ovale, subelongatum ; obscure nigro- et griseo-hirtum ; nigrum, antennarum articulis 3-7 tarsisque rufis ; sat crebre subaspere punctulatum ; sulcis antennariis profundis bene determinatis, triangularibus, postice clausis.
ntennis fere ut *T. Eyrensis* sed maris articulo 6° feminæ articulis 6° 7° que minoribus. Long., $1\frac{1}{8}$—$1\frac{1}{4}$ l. ; lat., $\frac{3}{8}$ l.
his species is much like *T. Eyrense* in its antennal structure, owing to the joints immediately preceding the club (and the joint of the club itself) being smaller, the club has no appearance of being six jointed in the male, and in the female it almost be regarded as only four jointed, and in both sexes ot quite so cyclindric in form. The uniform black or pitchy colouring (except the tarsi and the middle of the antennæ) at once separate this insect from the preceding two, and its subasperate puncturation (not less close and subasperate on prothorax than on the elytra) will furnish a further distinc-

outh Australia ; Adelaide district, &c.

indense, sp. nov. Late ovale ; fulvo-hirtum ; piceo-nigrum ; antennis pedibusque (femoribus vix infuscatis) testaceis, elytris testaceo-brunneis ; capite prothoraceque subtiliter (hoc latera versus crassius), elytris obscure vix crebre punctulatis ; sulcis antennariis profundis bene determinatis, triangularibus, postice clausis.
as. (?). Antennarum clava 5-articulata, quam articuli 1-6 conjuncti vix longiori articulis 3-6 parvis æqualibus, clava ovali hujus articulis 1° et 2° parvis fere cum stipite numerandis, 3° et 4° sat magnis inter se sat æqualibus, 5° quam 4^{us} paullo longiori vix angustiori. Long., 1 l. ; lat., $\frac{3}{8}$ l. (vix).
believe I have both sexes before me, and that the difference een them is very slight ; in one example the apical joint of ntennæ is certainly shorter and more rounded at the apex in the other. The seventh and eighth joints of the antennæ very much smaller than the following three, so that the club t almost be regarded as tri-articulate only ; but on careful nination I think those two joints really belong to the club, g different in form from the preceding four.
he entirely testaceous antennæ will *inter alia* distinguish this species from all the preceding.
outh Australia ; near Port Lincoln.

T. difficile, sp. nov. Elongato-ovale; obscure nigro- et gri hirtum; nigrum, antennarum articulis 3-7 tarsisque ru obscure subcrasse (prothoracis disco multo minus cra punctulatum; sulcis antennariis minus profundis, pos clausis, lateribus subparallelis.

Mas. (?) Antennarum clava 4-articulata, quam articuli conjuncti haud longiori, articulis 3-7 parvis, clava ov hujus articulo 1° parvo, 2° et 3° sat æqualibus, 5° qu 4ᵘᵃ multo longiori haud angustiori. Long., $1\frac{3}{5}$ l.; lat., $\frac{1}{1}$

The prosternal sulci in this species differ in form from th of the preceding; they are a little wider and less deep, and stead of the sides of each sulcus converging from its open b (on the front margin of the prosternum) continuously till t meet at the hind angle of the prosternum, they run alm parallel to each other for about half their length, and conve only in their hind portion.

The 3rd and following joints of the antennæ are very clos crowded together, and consequently difficult to count; it is o by examination under a high-power that I have satisfied my as to their number. As in some of the preceding species, the portionment of joints to the stem and club is no easy matter. a glance, the club seems to be 3-articulate, but on examinat the 8th joint seems clearly to go with those of the club, be evidently much wider than the preceding—but I cannot l upon the 7th joint as a part of the club. The robust apical jo (not at all narrower than the penultimate) gives the antenn very distinct appearance. The puncturation of the elytra als coarser than usual.

S. Australia; near Port Lincoln.

T. Macleayi, sp. nov. Late ovale, postice angustatum; nig hirtum; nigrum, antennis tarsis et elytris (macula ma communi discoidali nigra excepta) rufis; obscure vix cre (prothoracis disco magis subtiliter sat sparsim) punctulatu sulcis antennariis profundis bene determinatis, triangul bus, postice clausis.

Mas. Antennarum articulis 4-10 pectiniformibus, 3° minu 11° compresso-lamelliformi.

Femina. Antennarum articulis 5-10 leviter serratis, 11° o apice acuminato. Long., $1\frac{1}{5}$—$1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.—1 l.

The pectinations of the antennæ of the male increase in len to the seventh joint, those of the seventh, eighth, and ninth be about equal *inter se*, each of them about as long as the basal f joints together of the front tarsi, that of the tenth joint is a li shorter. The apical joint is a compressed somewhat pirifo lamella scarcely so long as the tenth joint.

South Australia and Victoria; on flowers.

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ccidentale, sp. nov. Ovale; nigro-hirtum; piceum, antennis tibiis tarsisque testaceis, elytris rufo-brunneis; crebre subaspere punctulatum; sulcis antennariis sat profundis bene determinatis, triangularibus, postice clausis; elytris abbreviatis.

emina (?). Antennarum clava elongato-ovali 6-articulata, quam articuli 1-5 conjuncti multo longiori, articulis (apicali quam 10^{us} paullo angustiori paullo longiori excepto) ex ordine latioribus.

he third, fourth, and fifth joints of the antennæ are small, equal or nearly so *inter se;* the club quite distinctly consists ix joints. I am doubtful of the sex of my unique example, it is probable that the comparative shortness of the apical t of the antennæ points to its being a female. The elytra abbreviated, and separately rounded behind, as in *Thaumasa;* the other characters are of *Trogoderma*.

Vest Australia; taken by E. Meyrick, Esq.

Baldiense, sp. nov. Elongato-ovale, subparallelum; obscure griseo- et nigro-hirtum; nigrum, antennis tarsisque testaceis, elytris apicem versus macula magna sanguinea utrinque ornatis; obscure vix crebre (prothoracis disco magis subtiliter magis sparsim) punctulatum; sulcis antennariis sat profundis bene determinatis, triangularibus, postice clausis.

eminæ antennarum articulis 6-10 leviter serratis, 11° ovali apice acuminato. Long., 2 l.; lat., $1\frac{1}{5}$ l.

his species is evidently a near ally of the preceding. My ue example is a female; its antennæ scarcely differ from e of the same sex in *T. Macleayi*, but the slight internal protion of the fifth joint which is distinct in the latter is here traceable. I have no doubt the antennæ of the male are very those of *T. Macleayi* (male). The large bright red spot near apex of each elytron is a very distinctive character.

Victorian Alps; crawling on snow on a mountain called Baldi.

Yorkense, sp. nov. Ovale; obscure nigro- et griseo-hirtum; nigrum, antennis tibiis tarsisque testaceis, elytris rufo-brunneis; crebre (prothoracis disco obscure sparsim) punctulatum; sulcis antennariis latis leviter impressis, parallelis, postice apertis.

Maris (?) antennarum clava 4-articulata quam articula 1-7 conjuncti subbreviori, ovali, articulo (clavæ) 1° quam sequentes multo breviori et angustiori, 2° et 3° inter se sat æqualibus, 5° vix angustiori, quam 3^{us} 4^{us} que conjuncti vix breviori. Long., $1\frac{1}{5}$ l.; lat., 1 l.

The distinction between club and stem in the elytra is very determinate, and some dilatation is discernible in the seventh

joint; it might be possible therefore to regard the club as f
jointed, but at a casual glance it would pass for being only th
jointed, as the eighth joint is very much narrower and sho
than the ninth. Although this species has altogether the gen
facies of *T. Eyrense, alpicola*, and their allies, it is very wid
distinct from them by the entirely different shape of the
sternal sulci, which are shallow (though perfectly well defin
much wider than the reception of the antennæ requires, para
sided or nearly so, and open behind.

S. Australia; Yorke's Peninsula.

T. Meyricki, sp. nov. Ovale; nigro- et albido-hirtum; nigr
antennarum basi tibiis tarsisque rufo-testaceis, elytris
rufescentibus; obscure sat crebre punctulatum; sulcis ant
nariis latis minus fortiter impressis, antice parallelis pos
vix manifeste clausis.

Maris antennarum clava 7-articulata, quam articuli 1-4 c
juncti plus duplo longiori, articulis 1-5 ex ordine latiorib
6° 5° æquali, ultimo quam 5ma sat longiori vix angustiori.

Feminæ antennarum clava 5-articulata, quam articuli
conjuncti vix longiori articulis 1-3 ex ordine latioribus, 4°
æquali, 5° 4° latitudine et longitudine æquali, apice rot
dato, Long., $1\frac{1}{6}$ l.; lat., $\frac{3}{5}$ l.

The different number of joints in the antennal club of the m
and female is unusual, but I think the two specimens before
are certainly the sexes of one species.

W. Australia; taken by E. Meyrick, Esq.

T. antipodum, sp. nov. Elongato-ovale, sat parallelum; nig
hirtum; nigrum, tarsis rufis, elytrorum apice vix rufescen
subtiliter sat sparsim punctulatum; sulcis antennariis s
obsoletis, latis, obliquis, postice apertis.

Maris antennarum clava 7-articulata, quam articulati,
conjuncti duplo longiori, sat cylindrica, articulo 1° qu
sequentes sat angustiori, ultimo acuminato quam 10ma
longiori. Long., $1\frac{1}{3}$ l.; lat., $\frac{1}{2}$ l.

The third and fourth joints of the antennæ are very minu
and form a slender connection between the basal two joints (wh
are robust, as in the rest of the species described above) and
cylindric club. The prosternal sulci are very wide and feeb
being not very noticeable, until in a certain light one sees
oblique track running along them and marking the position of
antennæ in repose.

S. Australia; near Adelaide.

T. singulare, sp. nov. Elongato-ovale, sat parallelum; nigro-
griseo-hirtum; fuscopiceum, elytris dilutioribus, anten
tibiis tarsisque testaceis; subtiliter sparsim punctulatu

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sulcis antennariis subobsoletis, latis, obliquis, postice apertis. Maris antennarum clava 7-articulata quam articuli 1-4 conjuncti plus duplo longiori, cylindrica, articulis 1° et 2° quam sequentes sat angustioribus, ultimo leviter acuminato quam 10^us^ sat longiori. Long., 1 l.; lat., ½ l. (vix).

The third and fourth joints of the antennæ are so minute that ey are not very easily observed, and at a glance the antennæ em to have only nine joints.

This species is very near the preceding, but differs from it part from the very different colouring) in the decidedly less ut antennæ and the extreme minuteness of the third and rth joints of the same. My unique example is considerably added, but I can trace indications of the grey pubescence on the ora, forming two fasciæ, which might perhaps be more distinct very fresh specimen.

. Australia; near Port Lincoln.

The following is a tabulation of the species described above:—

Elytra covering (or nearly so) the hind body.

B. Prosternal sulci sharply defined, triangular, very deep, and strongly closed behind.

C. Antennæ testaceous or rufous, unicolorous.

D. Tibiæ testaceous, elytra unicolorous, antennæ simply clubbed... ... ... Lindense.

DD. Tibiæ piceous, elytra red, with a large common basal black blotch, antennæ pectinated or serrate ... ... Macleayi.

DDD. Tibiæ black, elytra black, each with a large subapical red spot, antennæ serrate (female, probably pectinate in male) ... ... Baldiense.

CC. Antennæ with at least the club black, or nearly so.

D. Elytra black, their apex rufous.

E. Club of antennæ cylindric in both sexes... ... ... Eyrense.

EE. Club of antennæ oval (at least in the female)... ... ... alpicola.

DD. Elytra entirely black ... ... Adelaidæ.

BB. Prosternal sulci more feeble, not (or scarcely) closed behind.

C. Species of oval (non parallel) form, antennal club having less than 7 joints.

D. Antennæ having at least the club black difficile.

DD. Antennæ entirely rufous ... ... Yorkense.

CC. Species of oval form, antennal club of male 7-jointed ... ... Meyricki.

CCC. Species of parallel form, antennal club of male having 7 joints.
D. Antennæ entirely rufous ... ... singulare
DD. Antennæ having at least the club black antipodu
AA. Elytra strongly abbreviated ... ... occidenta

ADELAIDIA, *gen. nov.*

Trogodermati affinis sed antennarum clava sat laxe 3-articulat elytris abbreviatis singulatim rotundatis, propygidio in me aperto; unguiculis appendiculatis; sulcis antennariis perspicuis.

This genus is also near *Thaumaglossa*, which, however, 10-jointed antennæ, and distinct prosternal sulci for the recepti of the antennæ in repose. The antennal club of the spec before me consists of joints, none of which are distinctly tra verse, the first and third being quite as long as wide, the secc scarcely wider than long. *Trogoderma rigum*, Er., must superficially very like this species—so much so in fact, tha have thought it best to adopt the same specific name.

A. rigua, sp. nov. Late ovalis; pilis erectis nigris et adpre albis vestita; nigra, antennis pedibusque rufis, prothor ad latera et utrinque ad basin albo-pubescenti, elytris fas tenuibus 4 et macula apicali parva albopubescentil ornatis (fasciis 1ª basali 2ª antemediana, 3ª postmediana, subapicali); crebre subtiliter subaspere punctulata.

Feminæ (?) antennarum articulis 1° 2° que sat magnis, parvis inter se subæqualibus, clava 3-articulata oblo quam articuli ceteri conjuncti multo breviori, illius artic 1° 3° que inter se longitudine æqualibus 2° his brevi Long., 2 l. (vix); lat., 1 l.

S. Australia.

CRYPTORHOPALUM.

C. Australicum, sp. nov. Late ovale; pilis crebris (his nigris partibus nigris, rufis in partibus rufis) vestitum; nigr subtus vix rufescens, antennis tibiis tarsisque rufis, ely fascia antemediana et macula apicali rufis ornatis; obsc sat crebre (prothoracis disco vix perspicue) punctulat Long., 1—1½ l.; lat., ⅗—⅘ l.

S. Australia; near Port Lincoln.

C. Woodvillense, sp. nov. Ovale; pilis crebris (his nigris in pa bus nigris, testaceis in partibus dilutioribus) vestitu nigrum vel piceo-nigrum, antennis tibiis tarsisque testac elytris fasciis 2 et apice rufo-testaceis; crebre sat crasse aspere (prothoracis disco vix perspicue) punctulatum. Lo 1 l.; lat., ½ l.

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The sides of the prothorax bear some scattered whitish hairs. e anterior fascia of the elytra is slightly in front of the middle, l is rather wide and much zigzagged; the hinder fascia is a le narrower and less flexuous, and scarcely reaches the suture. some specimens there is a faint reddish spot on either side of scutellum.

The above two species appear to differ from those described by rr Reitter in having conspicuous red or testaceous fasciæ and rkings on the elytra, as well as in the pattern being different. the species of Herr Reitter the markings appear to be caused differently coloured pubescence on a unicolorous ground; in o of them these markings consist of *three* fasciæ, besides basal l apical spots, while in the other they consist of basal spots and ingle median fascia.

The present species differs from *C. Australicum* not only in the ttern on its elytra but in its smaller size and much coarser lpture.

S. Australia; Woodville.

interioris, sp. nov. Ovale, lateribus parum rotundatis; pilis crebris (his in elytris nigris in partibus nigris albis in partibus dilutioribus, in prothorace albis) vestitum; piceo-nigrum, antennis pedibusque testaceis, femoribus vix infuscatis, elytris maculis magnis testaceis nonnullis ornatis; sat crebre sat subtiliter subaspere punctulatum; antennarum clava minus dilatata, articulis 2 mox pone clavam vix a clava distinctis. Long., 1—1⅛ l.; lat., ½—$\frac{7}{10}$ l.

The comparatively small size of the antennal club and the inase in width of the eighth and ninth joints, making them apr almost as belonging to the club, are perhaps a little inconent with this genus, but the club is in other respects quite rmal, and all the other characters are as in typical *yptorhopalum*. Joints 3-9 of the antennæ are extremely short, nd 9 scarcely longer, though evidently wider than the preced- joints; 10 is as long as the preceding three together, and ch wider; 11 is very much longer and wider than 10, and is nded.

The pattern on the upper surface is very intricate. The prorax is much clothed with longish white hairs. Each elytron rs five large testaceous spots, of which one is close to the tellum, one behind the shoulder, one near the suture in front its middle (this and the spot behind the shoulder are in some mples obscurely joined into a fascia), one a little in front of apex on the disc, and 1 *at* the apex (the apical two are in ne examples obscurely joined into a vitta). The white hairs the elytra are not strictly limited to the testaceous parts, but m to form an independent pattern in three ill-defined fasciæ

(basal, median and subapical), and are also sprinkled over t
apex.

S. Australia; basin of Lake Eyre.

ANTHRENUS.

A. Museorum, Fab. This species is recorded as Australian
Mr. Masters' Catalogue. I have not seen an Australian examp
of it.

A. varius, Fab. Far too plentiful in S. Australian collection
also on flowers. It is not mentioned in Mr. Masters' Catalogu

A. australis, Hope. I have taken in various localities, o
flowers, an *Anthrenus* which agrees fairly well with the very bri
description of this insect. The only discrepancy is that the elyt
are (not black but) dark brown, becoming paler towards the ape
one example has *very* dark brown elytra, which might almost
called blackish, and it may perhaps vary to black. It has t
three wavy fascia of white pilosity as described. It has abdomin
sulci for the reception of the hind legs, and eleven-jointed a
tennæ with a three-jointed club.

A. ocellifer, sp. nov. Ovalis, lateribus parum rotundatis; confe
tissime squamis nigris fulvis et albis vestitus, supra squam
fulvis et albis submaculatim dispersis his in illis medi
positis, subtus squamis albis superficiem totam (nisi abd
minis latera et apicem fulvo-squamosa) tegentibus; nige
pedibus rufis; crebre sat subtiliter punctulatus; antenn
11-articulatis, clava 3-articulata; pedibus in sulcis recept
Long., $1\frac{1}{5}$—$1\frac{1}{2}$ l.; lat., $\frac{3}{5}$—$\frac{4}{5}$ l.

The black fulvous and white scales are on the prothorax mix
confusedly; on the elytra they take the form of fulvous spots
a black ground, the middle part of the fulvous spots being whit
there are seven or eight spots on each elytron. I do not kno
any other *Anthrenus* presenting the following characters in co
bination :—Antennæ eleven-jointed, with a three-jointed club,
the legs received in sulci, antennæ entirely black, legs entire
red, ventral segments without any black spots; body dense
scaly.

S. Australia; on flowers.

A. Flindersi, sp. nov. Ovalis; obscure nigro- et griseo-hirtu
niger, antennis totis tibiis tarsisque rufis, elytris apice ruf
centibus; crebre sat subtiliter (prothoracis disco min
crebre magis subtiliter) punctulatus; sulcis antennariis val
profundis, fere transversim positis, externe subrotundati
segmento ventrali basali utrinque transversim sulcato.

Maris (?) antennarum clava 3 articulata, articulis 1-8 co
junctis longitudine æquali, articulis 3-8 perbrevibus (7° et
paullo latioribus); clava cylindrica, hujus articulo 2° qua

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ceteri sat minori, articulo apicali apice rotundato-angustato. Long., 1½ l.; lat., ⅔ l.

Feminæ (? hujus speciei) antennarum articulo apicali quam 9us sat breviori (elytris fasciis albopilosis 2 instructis, altera basali altera antemediana, his secundum suturam conjunctis). Long., 1⅔ l.; lat., 1 l.

The prosternal sulci of this insect are very deep, run obliquely r almost transversely) across the front portion of the prosterm, their extremity being on the lateral margin considerably in ont of the hind angles of the prosternum, and are rounded at eir extremity (as in *A. Musæorum*).

I hesitate to refer the female described above to this species, account of its very much greater size, the somewhat conspicus fasciæ on its elytra, and the less clearly testaceous colour of antennal club. The male example described above is, however, rtainly abraded, and may have had the elytral fasciæ when esh. It may be distinguished from the species I take for *australis*, Hope, apart from colour, by the much larger club of antennæ.

S. Australia; near Port Lincoln, the male on flowers of *Hakea*.

BYRRHIDÆ.

BYRRHUS.

The following species is evidently congeneric with that which I scribed in Trans. Roy. Soc., XII., p. 138, as *B. Torrensensis*, hough the tarsi are still less contractile. I drew attention c. cit.) to the feebleness of the tibial channels in that species. the present insect the tarsi do not appear to be laid back in pose altogether *against* the tibiæ, but to be so placed that their se is in a groove at the apex of the tibiæ, and their apical nts are free. This character is inconsistent with *Byrrhus*.

raucus, sp. nov. Subglobosus; nitidus; subfortiter (prothorace crebre, elytris minus crebre) punctulatus; pilis nigris erectis perlongis crebre vestitus; supra æneus subcuprascens, antennis tarsisque rufescentibus; subtus niger, crebre fortiter rugulose punctulatus. Long., 1⅔ l.; lat., 1 l.

Very like *B. Torrensensis*, but more globose, clothed with nger hair, differently coloured, the prothorax more strongly nctured, the underside black or nearly so, and much more rongly and roughly punctulate.

Victoria; in the Alpine district.

HETEROCERIDÆ.

HETEROCERUS.

Victoriæ, sp. nov. Elongato-oblongus; sat nitidus; griseopubescens; piceo-niger, prothoracis lateribus elytrorum notis

numerosis tibiis intus tarsis et mandibulis rufis; prothorac angulis posterioribus marginatis; elytris creberrime minu subtiliter sat aspere punctulatis, sat perspicue striati Long., 2 l.; lat., $\frac{3}{5}$ l.

The markings on the elytra are well defined and intricat they consist of an irregular red lateral border scarcely reachi the base or apex; from this a branch runs off behind the should towards the suture, which on the middle of the disc turns upwa and reaches the base, along which it runs a short distance towar the scutellum, and then turns down again, running somewh parallel to (and close beside) the suture to about a third the leng of the elytron; the red lateral margin gives off another bran behind its middle, which runs obliquely forward almost to t hind extremity of the front branch, and is in the form of tw triangles having their apices directed hindward and their bases a continuous line; between this hind branch and the apex the is an elongate red spot.

This species is extremely like the European *H. marginatu* Fab. Compared with that insect it is a little narrower and le robust, with prothorax scarcely so strongly punctulate and elyt very evidently striate. The puncturation of the elytra is scarce different. The prothorax is a little more narrowed both in fro and behind, and has more strongly rounded sides, but is scarce less transverse.

Compared with *H. Flindersi*, Blackb., this insect has mu more closely punctulate elytra, while from *H. Australasi* Waterh., and *H. multimaculatus*, Blackb., it differs *inter alia* not having the elytra perceptibly narrowed behind the shoulde

Victoria; Alpine district.

H. indistinctus, sp. nov. Elongato-oblongus; minus nitidu griseo-pubescens; piceo-niger, prothoracis lateribus elytroru notis numerosis tibiis intus tarsis femoribus et mandibul pallide testaceis; prothoracis angulis posterioribus margin tis; elytris vix perspicue striatis, crebre sat subtiliter v aspere punctulatis. Long., 2—2$\frac{1}{5}$ l.; lat., $\frac{7}{10}$—1 l.

This species is undoubtedly very close to the preceding, but cannot regard it as a mere variety.

The markings on the elytra, from some points of view, are e tirely concealed by the pubescence; they are as follows on ea elytron:—A marginal band widely continued to both base a apex, which is dilated in a kind of blotch scarcely in front of t middle, and again immediately behind the middle; two elonga spots almost side by side on the disc a little in front of the middl a spot of variable form (bifid in some examples) on the disc ju behind the middle (in some examples this spot is connected wi

e external of the two anterior spots, and in some with the nder dilatation of the pale margin); an elongate subapical spot. The present insect differs from *H. Victoriæ* in colour, the ghter parts being pale yellow instead of rufous, and the femora ing testaceous instead of blackish, also in its non-striate elytra n most examples they are non-striate, in some there is a scarcely rceptible indication of striæ) and in the distinctly finer, less gulose, and less close puncturation of the elytra; the spines on e anterior tibiæ are more numerous, being nine or ten, while in . *Victoriæ* they number only seven or eight. Compared with . *Flindersi* the elytra are considerably more closely punctured; d the elytra not (or scarcely) narrowed behind the shoulders ill separate it from *H. Australasiæ* and *H. multimaculatus*. In me specimens (probably males) the prothorax is less transverse an in others.

Victoria; on the banks of the river Ovens.

H. Flindersi, Blackb. The puncturation of the elytra in this ecies is scarcely distinguishable from that in the European . *femoralis*, Kiesenw.

LAMELLICORNES

ATÆNIUS.

. *speculator*, sp. nov. Minus angustus; minus parallelus; minus nitidus; setis erectis pallidis brevissimis vestitus; niger, clypei margine prothoracis margine antico palpis antennis pedibusque rufescentibus; capite subtilius densissime punctulato (puncturis in rugis longitudinalibus confusis), clypeo antice sat fortiter rotundato-emarginato; prothorace crebre ruguloso-punctuato, fortiter transverso, angulis posticis plane rotundatis; elytris striatis, interstitiis convexis obscure asperato-granulatis. Long., 2 l. (vix); lat., $\frac{4}{5}$ l.

Differs from *A. australis*, Har., by its less narrow, less parallel rm, its pale setæ, scarcely costiform elytral interstices, prohorax much more narrowed hindward, and with scarcely any ace of a dorsal sulcus, &c., &c. The species described by Sir . Macleay as *Ammœcii* are stated by the Baron de Harold to e (at least some of them) *Atænii*. They are from N. Queensnd and N. W. Australia. None of them are described as being othed with pale setæ. *A. granulator*, Har. from New Guinea, ppears to be very near the present species, but to be somewhat rger, the clypeus subtruncate, &c.

In this species the humeral spine is small, but very well-marked, nd more directed outward than in *A. australis*, Har.

Victorian Alps.

. *Palmerstoni*, sp. nov. Minus angustatus; minus parallelus; minus nitidus; ater, pedibus piceis (anticis rufescentibus),

antennis testaceis; capite subtilius creberrime punctulat clypeo antice rotundato-emarginato; prothorace fortiter s crebre subrugulose punctulato, fortiter transverso, laterib sat parallelis, angulis posticis dentatis; elytris late sulcat sulcis intus seriatim granulatis, interstitiis anguste costat humeris fortiter spiniformibus. Long., 2½ l.; lat., 1 l.

The hind angles of the prothorax are very peculiar, bei strongly dentiform; behind the tooth-like projection the sid run evenly round hindward, so that the hind part of the pr thorax is in the form of a distinct wide lobe.

N. Territory of S. Australia.

ANOPLOGNATHUS AUREUS, *Waterh.*

From the "Zoological Record" for 1889, received a few wee ago, I learn that this species was described in the "Ann. a Mag. of N. Hist." for Oct., 1889. It must be very like (as r gards size, colour, &c.) my *Calloodes Frenchi*, described in a pap read before the Linnæan Society of N.S. Wales in March, 189 but I think the statement in describing *A. aureus* that its elyt have "only one or two lines of punctures at the sides," and th their "margins are not reflexed in the middle," is conclusive to the two being distinct. As remarked in a previous paper this series, I cannot regard *Calloodes* as really distinct fro *Anoplognathus*, although the name is convenient if it be regard as that of a subgenus founded on merely superficial characters.

BUPRESTIDÆ.

CHALCOPHORA.

C. Frenchi, sp. nov. Splendide viridis, cyaneo-micans; capi longitudinaliter excavato et in medio carinato (carina antri sum furcata); prothorace fortiter subcrebre vermiculat ruguloso, utrinque basi longitudinaliter impresso, linea d sali irregulari elevata; elytris costatis fere ut *C. superb* Saund. (sed costa suturali fere recta, submarginali plane apicem producta), apice subtruncatis, margine laterali p tice denticulato, apice suturali spiniformi; corpore subt crasse ruguloso; antennis obscure cyaneis, articulis basalib 2 viridibus. Long., 22 l.; lat., 8 l.

A magnificent species of brilliantly metallic colour, varyi from green to cyaneous or purple, according to the light in whi it is looked at. It is nearly allied to *superba*, Saund., from whi it differs (apart from colour) as follows:—The prothorax is mu more closely and evenly vermiculate (almost exactly as in *gig* Hope), and has a very distinct longitudinal impression runni forward from the base a little nearer to the lateral margin th to the middle on either side (I do not know any other Australi

cies of *Chalcophora* in which this character is so well marked); elytra are very much less narrowed off at the apex, and their tæ are a little differently arranged, that next the suture being allel to the suture (in *superba* the same costa is very strongly ved a little before the apex), and that nearest the lateral rgin being continued quite to the apex; the costæ, moreover, subobsolete near the base. On the undersurface the sculpture ery much coarser, the vermiculate smooth elevations occupying uch larger proportion of the area as compared with the dessed closely punctured spaces; the prosternum is concave longiinally between the coxæ (in *superba* it is convex), and the basal tral segment (the specimens before me seem to be of the same , probably female), is much more narrowly concave down the ldle, the apical ventral segment being narrowly sinuate-trune at the apex (it is not much different in same sex of *superba*, in the unique example before me is slightly chipped, and refore I cannot be quite certain). The concavity of the prornum will, I think, distinguish this species from all its near es (*i.e.*, *gigas*, Hope, *Waterhousei*, Masters, and *superba*, nd.); its colour also is completely distinctive, and from *terhousei* it may be known by its prothorax and elytra nonescent.

N. Queensland; in the collection of C. French, Esq.

STIGMODERA.

S. tibialis, Waterh. Mr. Tepper, of the S. Australian Museum, lately shown me a very fine series of this insect, which has ely been placed in the Museum by Mr. C. F. Johnson, M.P. ey were taken in W. Australia (near York), where, I do not nk, there has been any record of the species occurring. *ibialis* is evidently extremely variable, as I find the elytra of ne specimens entirely yellowish red, of others entirely dark , and of others dark red, with two or more more or less defined er fasciæ. In some examples the ventral segments are more less spotted with yellowish. Among all these varieties I do find any approximation to *S. Stevensi*, Gehin, in respect of colouring of the sides of the prothorax, but the acuteness of angulation on the intermediate tibiæ (which is said to be a inguishing character) is very variable in degree, and I am aid an examination of the specimens before me suggests inevite doubt as to the validity of Mr. Waterhouse's species.

princeps, sp. nov. Femina. Sat late oblonga, minus convexa; nigra, vix ænea, prothorace plus minus piceo-rufescenti, elytrorum lateribus (parte antica excepta) anguste (et apice late) sanguineo-marginatis; capite vix concavo, minus fortiter sat crebre (ut *S. parvicollis*) punctulato; prothorace

trans basin quam longiori vix dimidio (postice quam an
duplo) latiori, crasse confuse (indisco sat sparsim, q
S. parvicollis multo minus crebre) punctulato, mar
antico bisinuato postico in medio (ut *S. parvicollis*) lob
lateribus a basi ad medium fere parallelis; elytris (fere
S. parvicollis) valde striatis, interstitiis convexis subtil
sat sparsim punctulatis, apicibus simplicibus; sternis
medio sparsissime sat fortiter, latera versus sat cre
acervatim (prosterno crassissime rugulose) punctulatis;
domine nitidissimo fere lævigato, segmentis basali apicali
et ceterorum partibus lateralibus puncturis raris instru
Long., 20—24 l.; lat., 7½—8½ l.

The general appearance (in respect of colour and markings
suggestive of *S. grandis*, Don., but the prothorax is more or
reddish and without a pale margin, the elytral pale margin
gins more or less behind the base and is confined in front to
narrow edging outside the outermost stria (the next inters
being included from the middle or thereabouts), and the a
(about the apical one-fifth or one-sixth part of the whole ely
is sanguineous).

In all other respects this species is extremely close
S. parvicollis, Saund., from which it scarcely differs otherw
except as follows:—It is much larger and distinctly wider,
prothorax is evidently larger in proportion to the other parts
anterior narrowing commencing evidently further from the b
and is much less closely sculptured; on the undersurface (in
same sex) the sides of the metasternum and the ventral segm
are much less closely sculptured.

In all probability, the male differs from the female as
parvicollis, having the undersurface much more closely sculptu
and the apical ventral segment much shorter and subtruncate

W. Australia; taken by J. C. F. Johnson, Esq.

S. rectipennis, sp. nov. Sat angusta, sat parallela; nigra,
cyanea, elytrorum lateribus anguste (et apice late) sangui
marginatis, prothorace (in angulis posticis) et abdomine
nullis exemplis sanguineo-notatis; capite longitudina
late concavo minus fortiter sat crebre (ut præceder
punctulato; prothorace trans basin quam longiori dim
(postice quam antice fere duplo) latiori, confuse sat rugu
sat crebre (disco postice nec crebre rugulose) punctul
margine antico bisinuato postico in medio late sat fort
lobato, lateribus a basi fere ad medium subparallelis; ely
post humeros vix sinuatis, valde striatis, interstitiis
perspicue punctulatis, (6° toto 7° 8° que antice conf
rugulosis), apicibus late leviter emarginatis, biacutis;
pore subtus sat hirsuto, sat fortiter sat crebre subæqua

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(prosterno metasterno et in femina segmento 1° basali in medio sparsius subtilius, prosterni lateribus crassius) punctulato.

Iaris segmento ventrali apicali late leviter emarginato, feminæ truncato. Long., 1⅝ l.; lat., 5½—6 l.

his species is distinguishable from all others known to me of genus by the elytra being scarcely sinuate behind the ılders; in *S. macularia*, Don., the elytral sinuation is slight, in the present insect it is less marked still. I have seen two es and two females; both the former have the apical ventral nent bright red, and one of them has the penultimate red the antepenultimate spotted with red, while the other has ely the penultimate spotted with red; of the females one has hind body entirely black while the other has the apical segt spotted. The female with the hind body entirely black has prothorax also entirely black, in the other three examples ore me at least the hinder part of the lateral margin of the thorax is red.

V. Australia; taken by J. C. F. Johnson, Esq.

. imperator, Thoms. There can be no doubt, I think, that this nother name for *S. Murrayi*, Gemm. and Har., which was stituted in 1869 for *S. trifasciata*, Murr., a preoccupied name. omson's name was published in 1878, and therefore becomes a onym.

TENEBRIONIDÆ.

CÆDIOMORPHA.

. australis, Blackb. In describing this species (Trans. Roy. . S.A., 1887, p. 272) I accidentally omitted to state the size; s, long., 2 l.; lat., 1⅗ l.

LINDIA.

. angustata, Blackb. In describing this species (Trans. Roy. . S.A., 1887, p. 275) I accidentally omitted to state the size; s, long., 2 l.; lat., ½ l.

PLATYDEMA.

. obscurum, Blackb. (Proc. L.S., N.S.W., 1888, p. 1,430). G. C. Champion—a well-known English authority on the *ebrionidæ*—has kindly drawn my attention to the fact that was a pre-occupied name; I therefore propose *T. Championi* a substitute.

PHYTOPHAGA.

Prasonotus morbillosus, Chap. This name having been preoc- ied by Mr. Baly, I propose *Chapuisi* as a substitute.

CRYPTOCEPHALUS.

. consors, Boisd. I have recently seen an example of this

species sent to me by Mr. Olliffe for inspection, in which the yell
elytral margin is absent. This agrees with Boisduval's desc
tion. Suffrian (Mon. XIII., p. 103) seems to think that
yellow margin was accidentally overlooked by Boisduval, and
describes the insect as having it. In all other respects the ex
ple I am referring to seems to agree with specimens having
yellow border.

EDUSA.

This genus was originally formed by M. Chevrolat, and p
lished in M. Dejean's Catalogue (1837), but M. Lefèvre in 1
proposed to substitute *Edusia*, on the ground that *Edusa* wa
nom. præocc, having been used by Albers in 1860 for a genus
Mollusca. It is difficult to understand the reason of this propo
especially as *Edusa* was recognised and in use in the *Coleopt*
before 1860 by others than its author, M. Bohemann, for exam
having used it in 1858 for species that M. Lefèvre now c
Edusia. The species attributed to the genus differ considera
inter se in respect of facies and structure, in consequence
which Dr. Chapuis in 1874 (Gen. Col., vol. X.) proposed to ad
three names—*Edusa*, *Edusina*, and *Edusella*—as marking th
subgenera of *Edusa*. I do not think that this subdivision can
maintained, at any rate unless a number of other subgenera
added; I have a large number of species before me, not half
which will fit exactly into any of those Dr. Chapuis characteri
I shall therefore not attempt to apportion any of the new fo
among subgenera beyond remarking that the first six evide
would fall into the subgenus *Edusa*, and that *E. aenea* and *mi*
might probably fall in *Edusina*. *E. suturalis*, Chap., is the c
species I have seen that agrees with the description of *Edus*
The "Groupe *Edusites*" of Chapuis is characterised among
Eumolpidæ by the following in combination:—Prosternal
sterna convex in front, elytra transversely wrinkled. In this gr
Edusa was the only Australian genus known to Dr. Chapuis,
he separated it from those of other countries primarily by its b
pubescent. The Rev. H. Clark had, however, character
two other genera—*Thaumastomerus* and *Ocnus*—from N
Australia, but in such terms that Dr. Chapuis could not sat
himself even as to the "groupe" in which they should be plac
he could see no reason, however, to say that they might not
merely somewhat aberrant species of *Edusa*. It should not
overlooked, nevertheless, that Dr. Baly has since appeared to
cognise *Ocnus* as a good genus, having attributed to it a
species from N.W. Australia. I have not seen any *Edusites* f
N.W. Australia, or any species that seems to me likely to
long to either of the Rev. H. Clark's genera if they are dist
from *Edusa*. In 1885 M. Lefèvre formed a new genus

sites under the name *Cleptor*, which, however, does not seem iffer from *Edusa* by any very striking character. Apparently, *tor* has the eyes entire (instead of "obsoletely sinuate in"), the antennæ shorter, with the apex thickened; the body rous, the prosternum transverse, the femora unarmed, and tibiæ longitudinally sulcate; these are all the points of difnce I can discover. I have not seen any species in which all hem are to be found, but one or more characterise a good y species which I cannot separate from *Edusa*, and I think are all discoverable in some or other of the series in my colon. In 1889 I formed a new genus of *Edusites* under the e *Edusoides*, distinguished by its tibiæ being produced rally at the apex into an elongate horizontal process in both s; I have seen no other species presenting any indication of character.

Iy conclusion therefore is that I am unable to find any well-ked and constant character (except in the case of *Edusoides*) vhich to break up *Edusa* even into subgenera, and I accordy apply that name to all the Australian *Eumolpidæ* known to possessing the following characters in combination:—Pronal episterna convex in front, elytra transversely wrinkled at sides, tibiæ not externally prolonged at the apex into a horial process. The following characters in addition are present ll the species known to me:—Tibiæ not emarginate externally the apex, anterior femora very rarely altogether simple, the l joint of at least the anterior tarsi dilated in the male, claws ricate and appendiculate, the sexes differing *inter se* in the cture of the basal ventral segment. I may add that I think tter anatomist than myself might probably discover generic erences that I have not observed.

he following is a tabulation of the new species described w, together with such others of the *Edusæ* as I have identi. I do not think that I have seen any of the species from V. Australia which the Rev. H. Clark described, and the abe from his descriptions of reference to structural characters lers it impracticable to place those species (without having them) in a tabulation. A similar remark would apply to species described by Germar and Bohemann as having the erior femora unarmed; I have not seen any of these three, the descriptions do not state whether the femora are angulate ounded beneath. There remain unknown to me besides the ve *E. puberula*, Bohem., from Sydney (which seems to be near *E. bella*, but to have the clypeus entirely testaceous, and the ennæ shorter), and *E. viridicollis*, Lef. (which appears to be a ge species with dense pubescence, and the posterior tibiæ of the e incurved at the apex, characters I have not seen in combina).

It should perhaps be added that the antennæ are usu
slender filiform, and not very much shorter than the body.
they appear to vary a little in length sexually, I have not fo
them very useful for specific characters, and have not made sp
mention of them in my descriptions, except in a few cases w
their structure is exceptional.

A. Upper surface more or less pubescent or setiferous.
  B. The elytral vestiture consists of setæ or fascicles of
      about the sides and apex.
    C. Front angles of prothorax (at least fairly) well defin
      D. The elytral setæ forming fascicles.
        E. The femora testaceous.
          F. The prothorax very closely
              and roughly punctulate ... varipes, Boisd.
          FF. The prothorax not closely
              or roughly punctulate distincta, Bla
        EE. The femora entirely blackish spinicollis, Bl
      DD. The elytral setæ not forming
          fascicles.
        E. The prothorax not very closely
            punctured nor much wrinkled
            transversely.
          F. The scutellum punctured and
              scarcely nitid.
            G. Hind tibiæ of male strongly
                incurved at the apex ... varians, Blac
            GG. Hind tibiæ of male simple minor, Blackb
          FF. Scutellum nitid lævigate ... Froggatti, Bl
        EE. Prothorax very closely punc-
            tured and much wrinkled
            transversely ... ... chrysura, Ger
    CC. Front angles of prothorax quite
        rounded off ... ... diversicollis, B
  BB. The elytral vestiture evenly distri-
      buted, and in general much finer.
    C. Upper surface more or less metallic.
      D. Anterior femora simply rounded
          beneath ... ... inermis, Blac
      DD. Anterior femora widely angu-
          late, but not with a distinct
          tooth.
        E. Elytra set with erect hairs ... pavens, Black
        EE. Elytra with adpressed pubes-
            cence only ... ... Meyricki, Bl
      DDD. Anterior femora with a well-
          defined tooth.

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E. Elytra with well-defined vittæ of whitish pubescence; prothorax and elytra unicolourous otherwise.
F. Femora testaceous ... ... lineata, Blackb.
FF. Femora blackish ... ... ænea, Blackb.
EE. Species not marked and coloured as "E."
F. Hind femora rounded beneath.
G. Elytra set with longish erect hairs.
H. Prothorax nearly twice as wide as long ... pilifera, Blackb.
HH. Prothorax much less than twice as wide as long ... ... fraterna, Blackb.
GG. Elytra devoid of longish erect hairs.
H. Upper surface entirely green.
I. Puncturation extremely fine, and not asperate ... ... glauca, Blackb.
II. Puncturation much stronger and asperate bella, Blackb.
HH. Upper surface not entirely green.
I. Tooth on anterior femora exceptionally small.
J. Elytra with well-defined lines of whitish pubescence perplexa, Blackb.
JJ. Elytra uniformly pubescent ... suaveola, Germ.
II. Tooth on anterior femora normally large ... ... læta, Blackb.
FF. Hind femora dentate ... hirta, Blackb.
CC. Upper surface not metallic ... suturalis, Chap.
A. Upper surface glabrous.
B. Prothorax dentate laterally ... ... singularis, Blackb.
BB. Prothorax unarmed ... ... glabra, Blackb.

chrysura, Germ. Minus brevis; nitida; sparsim pilosa, pilis in elytris haud fasciculatis; supra læte metallica, colore

variabilis; antennarum articulis 1-4 testaceis (1° supra viri excepto), 5° 6° que ad apicem infuscatis, 7-11 (nonnul exemplis 7° ad basin excepto) piceis; corpore subtus æn vel nigro, griseo-pubescenti; femoribus æneis; tibiis test ceis, harum apice tarsisque infuscatis; palpis basi testace apice piceis; prothorace quam longiori multo latiori, anti minus angustato crebre rugosule punctulato et transversi fortiter strigato, lateribus regulariter rotundatis, basi l sinuata, margine antico bisinuato in medio sat product angulis obtusis, posticis certo adspecto subdentatis, scutel crebre nec profunde punctulato; elytris quam prothora quarta parte latioribus, fere ut prothorax sculpturatis s etiam magis fortiter transversim rugatis; prosterno et mes sterno inter coxas valde (et inter se æqualiter) latis.

Mas. Tarsorum anticorum et intermediorum articulo basa fortiter dilatato subovali; abdomine pilis erectis sat long insigni, segmento 1° ventrali in medio planato-elevato, par planata glabra subtilissime transversim strigata; tibiaru posticarum parte tertia apicali deformi introrsum valde i curva, spina apicali nulla. Long., 3¾—4 l.; lat., 1¾—2 l.

The prothorax is about three-fifths again as wide as long.

S. Australia; common.

E. varians, sp. nov. Subelongata; nitida; sparsim pilosa, pili in elytris haud fasciculatis; supra læte metallica, colore fer ut *E. chrysuræ* sed tibiis ad apicem vix picescentibus; pr thorace fere ut *E. chrysuræ* sed minus fortiter transversa multo minus crebre nec rugosule punctulato, haud distinct transversim rugato; scutello punctulato; elytris fere u *E. chrysuræ;* prosterno et mesosterno inter coxas minu latis.

Mas. Tarsis fere ut *E. chrysuræ* sed anticorum articulo basa breviori; abdomine pilis longis erectis insigni, segment ventrali basali in medio planato transversim subtilissim strigato haud elevato; tibiis posticis ad apicem fortite abrupte incurvis, ad apicem exteriorem spina armati Long., 3½ l.; lat., 1¾ l.

The prothorax is scarcely more than half again as wide a long.

S. Australia; common near Port Lincoln.

E. diversicollis, sp. nov. Elongata; nitida; sparsim pilosa, pili in elytris haud fasciculatis; supra læte metallica, colore fer ut *E. chrysuræ;* prothorace quam longiori vix dimidi latiori, subtiliter sat sparsim punctulato, lateribus vald rotundatis, margine antico antrorsum fortiter æqaliter con vexo, nullo modo (basi vix) bisinuato, angulis vix manifestis

scutello vix punctulato; elytris quam prothorax tertiâ parte latioribus, fere ut *E. chrysuræ* sculpturatis sed paullo minus crasse; prosterno et mesosterno inter coxas minus latis.

Mas. latet. Long., $3\frac{1}{3}$ l.; lat., $1\frac{3}{5}$ l.

Very distinct by the front margin of the prothorax being absolutely without sinuation, even at its outer extremities. In the absence of the male I cannot be certain that this species should be placed in this section.

Australia; I do not know the exact habitat of this species.

E. Froggatti, sp. nov. Minus elongata; nitida; sparsim pilosa, pilis in elytris haud fasciculatis; supra læte metallica, colore fere ut *E. chrysuræ* sed tibiis apice vix infuscatis et antennarum articulis omnibus (basin versus utique) testaceis vel piceo-testaceis; prothorace quam longiori circiter dimidio latiori, fortiter minus crebre punctulato, lateribus sat fortiter rotundatis, margine antico ad latera sinuato in medio antrorsum late fortiter convexo, basi bisinuato, angulis anticis distinctis posticis certo adspectu dentatis; scutello haud punctulato elytris fere ut *E. chrysuræ* (sed manifeste—præsertim postice—minus crasse) sculpturatis; prosterno et mesosterno inter coxas sat latis; femoribus posticis vix dentatis.

Mas. latet. Long., $3\frac{1}{5}$ l.; lat., $1\frac{3}{5}$ l.

The lævigate nitid scutellum furnishes a very distinctive character.

N.S. Wales; taken by Mr. Froggatt in the Blue Mountains.

E. spinicollis, sp. nov. Ovalis; nitida; sparsim pilosa, pilis in elytris fasciculatis; supra læte metallica; colore ut *E. chrysuræ;* prothorace quam longiori dimidio latiori, antice leviter angustato, crebre rugosule punctulato et transversim sat fortiter strigato, lateribus regulariter rotundatis, basi margineque antico bisinuatis, angulis anticis spiniformibus posticis obtusis; scutello sat fortiter punctulato; elytris fere ut prothorax sculpturatis sed magis fortiter transversim rugatis; prosterno et mesosterno inter coxas valde latis.

Mas. Tarsorum anticorum et intermediorum articulo basali modice dilatato; abdomine haud pilis erectis vestito, segmento basali in medio elevato planato, parte planata subtilissime transversim strigata; tibiis posticis apice minus fortiter incurvis. Long., $3\frac{1}{5}$ l.; lat., $1\frac{3}{5}$ l.

Extremely like the species which I take to be *E. varipes*, Boisd.; indeed, I regard it as possibly an extreme Alpine form of that insect, which differs from the present one by its entirely testaceous antennæ, and its legs also testaceous, except the infus-

cate apex of the tarsi, as well as by its prothorax very eviden
wider at the base as compared with the width of the base of t
elytra. *E. varipes* (?) moreover is nearly always of an obsc
brassy colour above, whereas all the examples I have seen of t
present species are bright blue or green, or coppery red. I m
add that the description of *E. varipes* is so defective that it
little more than a guess to attribute any insect to it. The bra
colour and fasciculated elytral pilosity are the only distincti
characters mentioned, and the colour of the legs and antenn
the size, and the sexual characters are all omitted. *E. varipes*
is found in N.S. Wales.

Victoria; in the Alpine district.

E. distincta, sp. nov. Modice elongata; nitida; sparsim pilo
pilis in elytris fasciculatis; supra læte metallica; colore
E. chrysuræ sed pedibus (tarsis apicem versus exceptis)
tennisque (articulis 1° supra ceterisque ad apicem summu
exceptis) testaceis; prothorace quam longiori fere du
latiori, antice leviter angustato, fortius minus crebre pu
tulato, lateribus leviter arcuatis, basi valde (margine ant
leviter) bisinuata, angulis omnibus distinctis vix acut
scutello punctulato; elytris crebre fortiter punctulatis
fortiter transversim rugatis (fere ut *E. chrysuræ*).

Mas. Latet.

Much like *E. varians*, but distinguished *inter alia* by
flavescent femora, very strongly transverse prothorax, and mu
more roughly punctured elytra.

Victoria; Alpine district.

E. minor, sp. nov. Modice elongata; nitida; sparsim pilo
pilis in elytris haud fasciculatis; supra læte metallica, colo
fere ut *E. chrysuræ* sed tibiis apice vix infuscatis; prothor
quam longiori paullo plus tertia parte latiori, cetera
E. Froggatti; scutello obscure punctulato; elytris fere
E. chrysuræ sed postice minus fortiter sculpturatis; p
sterno et mesosterno inter coxas sat latis; femoribus p
ticis vix dentatis.

Mas. Fere ut *E. chrysuræ*, sed segmento basali ventrali
medio haud elevato, tibiis posticis apice haud intus curvat

Femina latet. Long., $2\frac{1}{6}$ l.; lat., $1\frac{1}{3}$ l.

Very like *E. Froggatti*, but considerably smaller, with t
prothorax less transverse, and the front part of the elytra ve
much more roughly sculptured; the sexual characters of t
male also are probably different.

S. Australia.

E. ænea, sp. nov. Ovalis; sat parallela; pube grisea vesti
hac in elytris circiter 6-seriatim longitudinaliter disposit

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obscure ænea, labro antennis femorum tibiarumque basi rufis, antennarum articulis apice piceis, clypeo antice scutelloque viridibus; capite prothoraceque opacis coriaceis obsolete punctulatis; hoc quam longiori plus dimidio latiori, antice parum angustato subtruncato, lateribus leviter arcuatis, basi vix bisinuata, angulis obtusis; scutello crebre aspere punctulato; elytris subnitidis, vix substriatis, basin lateraque versus subrugosule punctulatis et obscure transversim rugatis alibi crebre subtiliter nec rugosule punctulatis.

Mas. Tarsorum anteriorum 4 articulo basali fortiter dilatato; tibiis posticis apice abrupte breviter incurvis; segmento ventrali basali in medio planato glabro nitido fere impunctulato. Long., $2\frac{1}{5}$ l.; lat., 1 l.

Victoria; Alpine district.

perplexa, sp. nov. Ovalis, subparallela; pilis fulvis vestita, his in elytris lineis crebris dispositis; capite prothorace scutelloque opacis coriaceis vix manifeste punctulatis læte viridibus; elytris obscure aureo-olivaceis, labro palpis antennis (harum articulis plus minus nigro-terminatis) pedibusque testaceis; prothorace quam longiori dimidio latiori, antrorsum vix angustato, antice posticeque bisinuato, lateribus modice rotundatis, angulis obtusis; scutello punctulato; elytris utrinque juxta scutellum subgibbosis, leviter subtilius sat crebre punctulatis, antice et latera versus transversim rugatis, et ibi magis crasse punctulatis; femoribus anticis dente parvo armatis, posticis muticis.

Mas. Tarsorum anteriorum 4 articulo basali sat dilatato; tibiis posticis apice manifeste nec fortiter incurvis; abdomine setis longis erectis vestito, segmento basali in medio planato pernitido lævigato. Long., 2 l.; lat., 1 l.

This species appears to be intermediate between Dr. Chapuis' ıb-genera *Edusina* and *Edusella*, the posterior tibiæ in the male aving their apex very briefly but quite distinctly bent inwards, ıe process, however, being so short that it might easily be passed ver without notice. The tooth on the front femora is scarcely rger than in *E. suaveola*, Germ.

Victoria; sent to me by C. French, Esq

lineata, sp. nov. Ovalis; sat parallela; pube grisea vestita, hac in elytris circiter 8-seriatim longitudinaliter læte dispositis; obscure ænea, labro antennis pedibusque (tarsis obscurioribus) læte testaceis; cetera ut *E. ænea*.

Mas. Fere ut *E. ænea*, sed tibiis posticis apice nullo modo incurvis. Long., $2\frac{1}{8}$ l.; lat., 1 l.

This species is remarkably like the preceding. It scarcely ffers from it, except in the colouring—the legs (except the

tarsi) being clear testaceous, and the elytra much more c
spicuously striped with pale grey—and in the hind tibiæ of t
male being straight. I have seen eight specimens of this spec
(of both sexes), and two males of the former, and the differen
seem quite constant. I do not think that they can be regard
otherwise than as two good species. Dr. Chapuis' arrangeme
of *Edusa* would place them in distinct sub-genera.

I have before me two female examples scarcely differing fr
this species except in being of a bright rosy colour with l
entirely testaceous and having the basal part of the elytra m
distinctly rugulose. In the absence of the male, I am at a l
to determine whether they represent a distinct species.

Victoria; Alpine district.

E. lata, sp. nov. Ovalis; pilis griseis æqualiter sat dense vestit
capite prothoraceque opacis coriaceis obsolete sparsim pu
tulatis, illo (scutelloque) læte viridibus, hoc aureo-brunn
certo adspectu viridi-micanti; elytris sat nitidis aur
brunneis subcupreo-micantibus, corpore subtus viridi, a
domine aureo-micanti, labro antennis palpis pedibusque la
testaceis; prothorace quam longiori vix dimidio latiori,
medio longitudinaliter obsolete carinato, antrorsum paru
angustato, antice bisinuato in medio sat producto, laterib
leviter arcuatis, basi leviter bisinuata, angulis obtusi
scutello punctulato; elytris leviter subtilius sat crebre pu
tulatis subhumeris vix transversim rugatis, puncturis bas
versus et ad latera crassioribus; femoribus anticis den
magno armatis, posticis muticis.

Mas. Tarsorum anteriorum 4 articulo basali modice dilatat
tibiis posticis apice haud incurvis abdomine in medio se
longis erectis vestito, segmento basali in medio planato p
nitido fere lævigato. Long., $2\frac{1}{5}$ l. (vix); lat., 1 l.

This species bears much resemblance to *E. suaveola*, Germ
from which, however, it may be at once distinguished by t
much larger tooth of the anterior femora.

Victoria; Alpine district.

E. bella, spec. nov. Ovalis; sat parallela; pube aurea subt
æqualiter sat dense vestita; supra omnino læte prasina subt
viridis, abdomine aureo-micanti; labro palpis antennis pe
busque testaceis; capite prothoraceque opacis coriaceis obs
lete sparsim punctulatis; prothorace fere ut *E. lætæ* s
haud carinato, antice in medio parum producto; scutel
punctulato; elytris femoribusque fere ut *E. lætæ*, sed femoru
anticorum dente minori.

Mas. Tarsorum anteriorum 4 articulo basali modice dilatat
tibiis posticis apice haud incurvis; abdomine in medio se

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longis erectis vestito, segmento basali in medio vix planato. Long., 1⅛ l.; lat., 1 l. (vix).

This species (of which I have both sexes) might almost pass for a small differently coloured form of *E. læta*, but on careful examination I am convinced that it is really distinct, the prothorax having its front margin evidently less produced in the middle, and being quite devoid of the faint carina which runs down the middle in the latter; the basal ventral segment in the male, moreover, is much less lævigate.

Victoria; Alpine district.

E. glauca, sp. nov. Sat breviter ovalis; sat nitida; pube supra aurea subtus grisea sat dense vestita; supra sat pallide viridis vix aureo micans, subtus magis ænea, labro palpis antennis pedibusque testaceis; capite prothoraceque subcoriaceis leviter minus crebre punctulatis; hoc quam longiori dimidio latiori, antrorsum vix angustato, antice fortiter bisinuato in medio late fortiter producto, lateribus fere rectis, basi bisinuata, angulis obtusis; scutello punctulato; elytris crebre subtiliter punctulatis, latera versus paullo magis fortiter punctulatis et vix transversim rugatis; femoribus anticis dente mediocri armatis, posticis muticis.

Mas. Tarsorum anteriorum 4 articulo basali parum dilatato; tibiis posticis apice haud incurvis; abdomine in medio setis paucis longis erectis vestito, segmento basali in medio planato nitido fere lævigato. Long., 1⅛—2 l.; lat., 1—1⅕ l (vix).

Of a paler, more "dead" green colour than *E. bella*, otherwise closely resembling it in colour, but at once distinguishable by much finer puncturation of the elytra and the much more distinct puncturation of the prothorax. The tooth on the anterior femora is very evidently larger than in *E. suaveola*, Germ.

S. Australia; not uncommon on flowers near Port Lincoln.

E. pilifera, sp. nov. Breviter ovalis; sat nitida; pilis griseis brevibus æqualiter sat dense vestita, nonnullis in elytris intermixtis multo longioribus erectis nigricantibus; rosea-metallica, subtus obscure ænea, labro antennis palpis pedibusque rufo-testaceis; capite prothoraceque distincte leviter sat sparsim punctulatis, hoc quam longiori fere duplo latiori, antrorsum vix angustato, antice fere truncato, basi rotundata, lateribus leviter arcuatis, angulis obtusis; scutello punctulato; elytris leviter minus subtiliter sat crebre punctulatis, sus humeris sat fortiter transversim rugatis et ibi crasse fortiter punctulatis; femoribus anticis dente parvo armatis, posticis muticis.

Mas latet. Long., 1⅛ l.; lat., 1 l.

A very distinct species, much shorter and wider than any of

the preceding, and with coarser puncturation; the erect lo hairs on its elytra are also a good character. The tooth on t anterior femora is not much larger than in *E. suaveola*, Germ.

Victoria; Alpine district.

E. fraterna, sp. nov. Ovalis; sat nitida; pilis albidis et nc nullis elongatis erectis fulvis, confuse vestita; obscure æn labro palpis antennis (harum articulo basali supra et ultin ad apicem obscurioribus) femorum basi tibiisque testace capite prothoraceque crebre sat fortiter punctulatis; h quam longiori vix dimidio latiori, antrorsum parum ang tato, antice in medio late sat fortiter producto, lateribus s fortiter rotundatis, basi vix bisinuata, angulis rotunda obtusis; scutello punctulato; elytris sat fortiter rugosu punctulatis, apicem versus substriatis, pone humeros fortit transversim rugatis; femoribus anticis dente sat mag armatis, posticis muticis.

Mas. Tarsorum anticorum articulo basali modice (int mediorum vix manifeste) dilatato; tibiis posticis apice ha incurvis; segmento 1° ventrali in medio pernitido lævig Long., 2 l.; lat., 1 l.

Resembles *E. perplexa* in colour and build, but *inter alia* very much more coarsely punctured, and the hind tibiæ of t male are not at all incurved at the apex.

Victoria; Alpine district.

E. hirta, sp. nov. Breviter ovalis; sat nitida; densissi æqualiter griseo-pubescens; supra roseo-cuprea, subtus æn clypeo viridi, labro palpis antennis pedibusque (horu nonnullis exemplis, femoribus tibiisque apice plus minus fuscatis) testaceis; capite prothoraceque subcoriaceis obsole punctulatis; hoc quam longiori fere duplo latiori, antrorsu parum angustato, antice profunde bisinuato, in medio la fortiter producto, lateribus leviter arcuatis, basi levit bicinuata, angulis anticis productis sat acutis, posticis c tusis; scutello punctulato; elytris substriatis, crebre min fortiter (latera versus magis fortiter) punctulatis, s humeros obscure transversim rugatis; femoribus anti dente sat magno, posticis sat parvo, armatis.

Mas. Tarsorum anticorum articulo basali sat fortiter (int mediorum vix manifeste) dilatato; tibiis posticis apice ha incurvis; segmento 1° ventrali in medio paullo min crebre punctulato. Long., $1\frac{1}{2}$—2 l.; lat., $\frac{4}{5}$—1 l.

The dense grey pubescence under which the sculpture a colouring is buried will distinguish this species from all known me of its congeners.

S. Australia; Yorke's Peninsula.

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. *pavens*, sp. nov. Sat breviter ovalis; sat nitida; pilis griseis brevibus æqualiter sat dense vestita, nonnullis intermixtis longioribus erectis nigricantibus; ænea, labro palpis antennis pedibusque testaceis; capite prothoraceque sat subtiliter sat crebre punctulatis; hoc quam longiori circiter dimidio latiori, antrorsum haud angustato, antice in medio late valde producto, basi manifeste bisinuata, lateribus subdeplanatis fortiter rotundatis, angulis anticis fere rotundatis posticis obtusis; scutello punctulato; elytris subfortiter punctulatis et transversim rugatis; femoribus anticis late angulatis vix dentatis, posticis muticis; antennis minus elongatis apicem versus subincrassatis.

Mas. Latet. Long., 1½ l.; lat., ⅓ l. (vix).

This little species resembles *E. fraterna* in the stiffish erect istles with which it is clothed, and also resembles *E. Meyricki* ide infra) in general appearance and its antennal structure, but ffers widely from both *inter alia* in the shape of its prothorax, id from the latter in its much coarser sculpture.

W. Australia; taken by E. Meyrick, Esq.

Meyricki, sp. nov. Sat breviter ovalis; sat nitida; sat æqualiter sat dense griseo-pubescens; ænea subcuprascens, labro palpis antennis (articulo 1° supra et ultimis apicem versus exceptis) pedibusque testaceis; capite prothoraceque subcoriaceis et leviter sat sparsim punctulatis; hoc quam longiori dimidio latiori, antrorsum sat angustato, antice leviter bisinuato in medio late sat fortiter producto, lateribus modice rotundatis, basi leviter bisinuata, angulis anticis fere acutis posticis rectis; scutello punctulato; elytris leviter vix crebre (latera versus paullo crassius et hic obscure transversim rugatis) punctulatis, femoribus anticis late angulatis vix dentatis, posticis muticis; antennis minus elongatis apicem versus subincrassatis.

Mas. Tarsorum anteriorum 4 articulo basali fortiter dilatato; tibiis posticis apice haud incurvis; segmento ventrali basali in medio subplanato sublævi. Long., 1⅓ l.; lat., 1 l.

The whitish grey pubescence on the elytra is here and there ndensed into a somewhat conspicuous patch or tuft, but it is ssible that this may be due to the rest of the surface being a tle abraded in my unique example. The antennæ shorter than ual in the genus, and having the apical joints a little incrassated rnish a very noticeable character.

W. Australia; taken by E. Meyrick, Esq.

. *inermis*, sp. nov. Ovalis; nitida; pube aureo-fulva sat æqualiter sat dense vestita; viridi-metallica, labro palpis antennis pedibusque testaceis; capite prothoraceque fortius

minus crebre punctulatis ; hoc quam longiori circiter dim latiori, antrorsum vix angustato, margine antico vix sin antrorsum producto, basi vix bisinuata, lateribus sat for rotundatis, angulis anticis fere rectis posticis obtusis ; scu punctulato ; elytris sat fortiter sat crebre punctulatis, a latera versus subcrasse rugatis ; femoribus muticis ; ante quam corpus sat brevioribus.

Maris tarsorum anteriorum 4 articulo basali modice dilat tibiis posticis apice haud incurvis ; abdomine setis l erectis vestito ; segmento basali in medio subplanato p tido sublævi obscure transversim rugato. Long., 1 lat., $\frac{4}{5}$ l.

The sculpture of the elytra is much like that of *E. pavens*, the prothorax is much more strongly and less closely punctu This species also probably resembles *E. evanescens*, Boh., but latter appears to be a considerably smaller insect still, with clypeus yellow, the head opaque, and the antennæ as long a body.

S. Australia ; a single example in the S. Australian Muse

E. glabra, sp. nov. Breviter ovalis, lata ; glabra ; colore va ilis, viridis vel purpurea, labro palpis antennis pedibu (horum trochanteribus nigris) testaceis ; capite prothorac subtiliter (hoc ad latera, fortius) minus crebre punctul hoc quam longiori fere duplo latiori, antrorsum angus antice fortiter bisinuato, basi fortiter bisinuata, late leviter arcuatis, angulis anticis acutis posticis obt scutello vix punctulato ; elytris sat fortiter subseri (seriebus subgeminatis) punctulatis, apicem versus striatis, vix transversim rugatis ; femoribus anticis d parvo armatis, posticis muticis ; tibiis extus obscure l tudinaliter canaliculatis ; antennis quam corporis dimi sat longioribus.

Mas. Tarsorum anteriorum 4 articulo basali fortiter dil tibiis posticis haud apice incurvis ; abdomine (exempli culi unici) fracto. Long., $1\frac{1}{2}$—$1\frac{4}{5}$ l. ; lat., $\frac{4}{5}$—$1\frac{1}{5}$ l. (vix

This species presents several of the distinctive character tributed to *Cleptor*, but its dentate anterior femora and ante —quite two-thirds the length of the whole body—forbid its b placed in that genus.

E. singularis, sp. nov. Ovalis ; nitida ; glabra ; colore v bilis (ænea vel violacea vel cuprea), antennarum palporu basi pedibusque rufo-brunneis ; capite fortiter confus crebre punctulato ; prothorace quam longiori fere d latiori, antrorsum sat angustato, antice bisinuato in m late sat fortiter producto, crasse rugulose minus c

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punctulato, lateribus fortiter rotundatis tridentatis, basi bisinuata, angulis anticis spiniformibus posticis breviter dentatis; scutello lævi; elytris fortiter punctulatis, postice striatis minus fortiter punctulatis, latera versus transversim valde rugatis; femoribus anticis dente parvo armatis, posticis muticis; tibiis extus canaliculatis.

Mas. Tarsorum anteriorum 4 articulo basali valde dilatato; tibiis posticis haud apice incurvis; abdomine setis longis erectis vestito, segmento basali in medio planato, penultimo in medio lævigato pernitido, ultimo fossa profunda instructo. Long., 3 l.; lat., $1\frac{1}{2}$ l.

A remarkable insect, with no near ally among described ecies; it might perhaps be regarded as the type of a new genus. some of its characters it agrees with *Cleptor*.

Victoria; Alpine district.

COCCINELLIDÆ.

ORCUS.

cœlestris, sp. nov. Sat fortiter convexus; sat nitidus; supra cœruleus, viridi violaceoque micans; subtus niger—antennis, tarsis, tibiis anticis et abdomine testaceis; capite sparsim subtiliter, prothorace subtiliter minus sparsim, elytris sat crebre subfortiter, punctulatis. Long., $1\frac{4}{5}$ l.; lat., $1\frac{3}{5}$ l. (vix).

A very pretty species, resembling in colour *O. cyanocephalus*, uls., and *chalybeus*, Boisd., but scarcely so convex as either of ose insects, and much more strongly and closely punctured an either of them, or than *O. Australasiæ*, Boisd. From *cyanocephalus* it differs also in the colour of the legs, and from *chalybeus* in the more strongly rounded sides of the prothorax. *Lafertei*, Muls., I have not seen, but it appears to be a larger sect, of somewhat similar colour, but having some conspicuous olet spots symmetrically arranged on the prothorax.

N. Territory of S. Australia.

Description of a New Genus and Spec of Marsupialia, "*Notoryctes typhlops*."*

By E. C. Stirling, M.A., M.D

Lecturer on Physiology in the University of Adelaide, Hon. Direct of the South Australian Museum.

[Read February 3, 1891].

The first specimen of this animal, received by the South A tralian Museum, was forwarded by the courtesy of Mr. Molineux, Secretary of the Agricultural Bureau. Wrap merely in a rag saturated with kerosine and enclosed i revolver-cartridge box, it had travelled over a thousand m largely by packhorse and coach. Consequently it was in a bad condition on arrival in Adelaide. On this specimen, w appeared to be a female, were based some preliminary notes municated to the Royal Society of South Australia on the September, 1888, and an almost similar communication was m to the correspondence columns of '*Nature*' shortly afterwa Some few months subsequently I received three more specim all males, of which one only was in anything like good prese tion. The reasons for the delay in the publication of the pre description, which is based upon an examination of the four s mens then to hand, and for the new name under which it appears, are explained in a concluding paragraph. By the kind of His Excellency the Governor, Lord Kintore, I have rece had the opportunity of making, with him, the complete transit f North to South of the Australian Continent. Though opportunity of traversing the zoologically unexplored regio Central Australia would, under any circumstances, have pr an attractive programme, a special inducement for the jou was afforded by the fact that our route must pass through tract of country in which the animal had been found, and h arose the possibility of my being able to secure additional s mens. In this expectation I have happily been successful, I was fortunate enough to secure six complete examples, and skeleton. Amongst these are four females, which sex had represented only by the first specimen. This, however, was so m decomposed as to leave some doubt of its character. On return from the transcontinental journey, I found the pre

* The name "Psammoryctes," originally selected for this new g having been already appropriated, that here employed is substituted.

paper in the printer's hands, and it will be submitted practically as I left it. Nevertheless, I am now in a position to offer some interesting particulars of its habits, which were obtained on my journey, and also to verify the important fact of the existence of a well-marked pouch in the female, on which point I could not at first be absolutely certain from the bad condition of the soft parts in the first specimen received. Unfortunately, an accidental circumstance together with certain political exigencies made it necessary that His Excellency's journey should be made with greater rapidity than could be wished from my point of view, and it thus became impossible for me to reach the exact locality where the specimens had been found; but I passed within fifty miles of the spot, and through country which is of a precisely similar character. Further, I had the advantage of meeting on our journey the man who himself captured the first specimen sent down, and by the kind consideration of the manager of the Idracowra Station, their book-keeper, Mr. J. F. Bishop, was instructed to wait for me at a stated locality through which our track must pass. To Mr. Bishop's zealous efforts I owe the whole of the last lot of specimens, as well as much valuable information concerning their habits and habitat. As may be imagined, it was with feelings of much satisfaction that, on reaching our camp one evening at the Horse-shoe Bend of the Finke River, I met Mr. Bishop with his welcome complement of specimens safe in his saddle-bags. From Mr. C. Benham also, who had previously been employed on the same run, and by whom the first specimen was forwarded to the Museum, I have also received much valuable information concerning the animal. Both Mr. Bishop and Mr. Benham have seen the animals alive, in a state of nature as well as in captivity, and the following notes comprise all the information that I could acquire from these two principal sources, as well as from some natives of the locality whom I questioned on the matter.

HABITS AND HABITAT.

It appears that the first specimen was captured by Mr. Wm. Coulthard, manager of the Frew River Station and other Northern runs belonging to the Willowie Pastoral Company. Attracted by some peculiar tracks, on reaching his camp one evening on the Finke River, while traversing the Idracowra Station with cattle, he followed them up and found the animal lying under a tussock of spinifex or porcupine grass *(Triodia irritans)*. Though he is an old bush hand, with all the watchful alertness and powers of observation usually acquired by those who live lives of difficulty and danger, this was the first and only specimen of the animal he ever saw. As previously stated, this found its way to the Museum through the agency of Messrs. Benham and

Molineux. The three subsequently received shortly after
as well as the last lot recently secured by Mr. Bishop duri
journey through the country, were also found on the Idr
Station. This is a large cattle-run comprising several h
square miles of country in the southern part of the No
Territory of South Australia, which lies immediately to th
of the telegraph line between the Charlotte Waters and
Springs Stations. The great dry watercourse of the Finke
which runs from N.W. to S.E., bounds the run for some
miles on the North and North East. Its distance from A
is roughly speaking a thousand miles. Flats and sandl
red sand, more or less well covered with spinifex and s
constitute a large portion of the country, and the rain
inconsiderable. Curiously enough, all the specimens h
received by me have been found within a circumscribe
four miles from the Idracowra Head Station, which is situ
the Finke watercourse itself, and almost invariably amon
sandhills. I have it, however, on very fair authority, th
animal has been seen on the Undoolya Station, which lies i
ately South of the McDonnell Ranges, and that one al
found drowned after heavy rain at Tempe Downs, a
situated about 120 miles W.S.W. of Alice Springs.
points will sufficiently define its range, so far as is kn
present. They do not appear to be very numerous. Ve
of the white men in the district had ever seen it, even
constantly travelling, and not many of the natives whom
across recognised the well-executed coloured drawing I
with me. It must be remembered, however, that I did n
through the exact spot which so far appears to be its f
distribution. Nor did a very considerable reward, which I
cause any specimens to be forthcoming between the f
received, over two years ago, and that recently secured
my transcontinental trip. With few exceptions the anima
been captured by the aboriginals, who, with their phen
powers of tracking, follow up their traces until they are
For this reason they can only be found with certainty aft
which sets the surface of the sand and enables it to retain
that would immediately be obliterated when it is dry an
Nor are they found except during warm weather. So th
short period of semi-tropical summer rains appears to
favourable period for their capture. For this suitable co
tion of wet and warmth, Mr. Bishop had to wait three
before he was able to get them, and in all cases they wer
during the day time. Perpetual burrowing seems to
characteristic feature of its life. Both Mr. Bishop a
Benham, who have seen the animal in its native state, rep

emerging from the sand it travels on the surface for a few feet, at a slowish pace, with a peculiar sinuous motion, the belly much flattened against the ground while it rests on the outsides of its fore-paws, which are thus doubled in under it. It leaves behind it a peculiar sinuous triple track, the outer impressions, more or less interrupted, being caused by the feet, and the central continuous line by the tail, which seems to be pressed down in the rear. Constantly on the look-out for its tracks, I was often deceived by those of numerous lizards, which are somewhat similar in these respects. It enters the sand obliquely and travels underground either for a few feet or for many yards, not apparently reaching a depth of more than two or three inches, for whilst underground its progress can often be detected by a slight cracking or moving of the surface over its position. In penetrating the soil free use, as a borer, is made of the conical snout with its horny protecting shield, and the powerful scoop-like fore-claws are also early brought into play. As it disappears from sight, the hind limbs, as well, are used to throw the sand backwards, which falls in again behind it as it goes, so that no permanent tunnel is left to mark its course. Again emerging, at some distance, it travels for a few feet upon the surface and then descends as before. I could hear nothing of its making, or occupying at any time, permanent burrows. Both my informants lay great stress on the phenomenal rapidity with which it can burrow, as observed both in a state of nature and in captivity. In some notes sent me by Mr. Benham the following statement appears:—"Almost any of the men here (Idracowra) can tell you how one got away from me in the loose sand. I brought it home alive, and began talking about how fast it could burrow, so Mr. Stokes wanted to see it. We took a spade and loosened the top soil near the house, and put it down; I kept my hand close to it until it was nearly out of sight, and then started scratching after it, but it was too quick; so I took a shovel and began to dig after it, but could not get him. One of the men then came with another shovel, and also a lubra (aboriginal female) who scratched, but the three of us failed to get him." Making all allowances for possible misdirected energies in this experiment, there is no doubt but that their burrowing powers are remarkable. Mr. Bishop, who knew of my approach, made great efforts to keep alive for me some of those he had captured, and placed them for safe keeping in buckets of sand, but in spite of all care and attention one only lived as long as four days. Night and day the sound of their ceaseless burrowing was to be heard. Acting on my advice, previously given, in consequence of an examination of the contents of the intestines of one of the earlier specimens, he supplied them with

ants as food, but they ate none. They did, however, e
"witchety," the native name of large white grubs,
relished by the blacks as an article of food, which are the
forms of certain Longicorn beetles and Lepidoptera, ar
Benham informed me that one of his ate a piece of bread
occasion, but it only lived a day. They thus appear to
captivity extremely badly. On being handled they ma
attempt to bite. No blackfellow that I questioned had ev
the young, nor did they know anything whatever of any n
breeding places used by them. Their native name is "oor-quá
the terminal "*r*" of the first syllable being much rolled so as
to convey the sound of an interpolated short "*i*" between t
and the "*q*"; the accentuated syllable is strongly marke
vowels having the same value as in "quarrel." Mr. B
stated that the natives have a superstitious dread of the
applied to one the term "kudoicka," which they transl
"devil-devil"; but I could not get this confirmed by any
blacks I saw. In fact the natives seem to know very little
them and could give me no information whatever as to wha
food was or whether they got it under or above ground. W
material at my disposal I should be able definitely to sett
point, and indeed, in one of my first specimens, I did
certainly find the remains of ants and some other insect
in what remained of the intestines; but as the Editor o
Transactions urgently calls for the completion of this paper
reluctantly obliged to postpone to a future issue the re
further investigation on this and other points.

GENERAL DESCRIPTION.*

(Pl. II., III., and IV.)

The fur, in the three specimens (all males) in which
sufficiently well preserved for accurate description, m
described as being generally of a light fawn colour, long, so
of a bright lustrous and silken appearance. In parts it d
to a glistening golden hue, and in others it inclines mor
silvery aspect. In the last specimen received, which was in a
better state of preservation than any of its predecessors, t
was considerably lighter than in the others, and the silve
more pronounced. The colours of all these have faded consid

* It will be remembered that the following description is based u
examination of the first four specimens received in 1888 and 1889
only of these had been satisfactorily preserved in spirit; all the
were merely wrapped in rag saturated with kerosine and enclosed i
tin boxes. I have, however, incorporated some additional infor
having reference to the pouch in the female.

since they have been kept in spirit, but plates II. and III. which were made soon after their receipt, give a fair idea of the original colour.* In two, the fawn changed to a darker and somewhat rusty tint round the root of the tail, both on the upper and under surface; but this was scarcely marked in the lighter coloured specimens. Two also showed a distinctly darker coloured patch on the back over the region of the pelvis.

The shoulder, being brought forwards close up to the skull, leaves no appearance externally of a neck, and the head together with the front portion of the trunk, gradually widening from the snout backwards to the shoulders, form a sort of blunt-ended cone, which is flattened somewhat on its under surface and directed downwards. This, with a curiously similar ventral flexion of the posterior part of the trunk and tail, gives the whole body a characteristically arched appearance, so that when placed on a flat surface the snout, hands, feet, and tail are almost in the same plane.

The dorsal surface of the nose is covered with a hard horny shield, marked by a transverse ridge which divides it into an upper (posterior) and a lower (anterior) segment. The front margin of this shield bounds the external nares and is prolonged downwards on on each side of these apertures; it forms also the anterior border of the septum narium which is continuous with a horny plate of a similar texture, though less hard and horny, corresponding to the upper lip. The fur extends right up to the margins of the whole of this horny area; but immediately adjacent to its sides, and especially margining the upper lip, it is shorter, coarser, stiffer and of a lighter colour, approximating to the character of whiskers. This has been a trifle exaggerated in pl. II., fig. 2, and insufficiently expressed in fig. 1.

The nostrils looking downwards and forwards are wider in the transverse than in the vertical direction, and are rendered very irregular in outline from the encroachment of two processes from the surrounding horny shield—one from the upper the other from the outer margin.

The mouth, ventral in position, has, when viewed from that aspect, a contour represented by two sides of a slightly obtuse-angled triangle. The extreme point of the chin is destitute of hair, but on its under surface and margining the under lip there are the same short stiff hairs as on the upper lip. The tongue, fleshy, broad at the base and tapering to a blunt point, is somewhat similar in shape to the human tongue, but relatively longer and narrower.

No eyes are visible externally, and the smallest opening

* Plate III. does this more accurately than Plate II., in which latter the colour is represented as too uniformly golden, as well as a shade too dark.

through the skin corresponding to their position cannot
detected. The ear-openings are distinct, two mm. in diame
though almost completely concealed by the fur which grows ri
up to their margins. The aperture is surrounded by a ring-like
of the integument, which very slightly raises its margin above
level of the surrounding skin, and in the interior of the mea
are thickly-set vibrissæ. Its position is 15 mm. behind
above the angle of the mouth, measured along a line which wo
continue the normal direction of the mouth-slit backwards.

The tail is peculiar. Hard, tough, leathery in texture
appearance for the greater part, it is marked with conspicu
annular ridges to the point. Thick at its insertion, it tapers
blunt or even knob-like tip. On the dorsal surface, the soft
of the body extends over it for about half its length, but
ventral and lateral surfaces are bare nearly to the anus.
about its middle there are two lateral projections or tuberosit
which give increased width to the tail in that position, causin
to be there even wider than at the point of its insertion. Thi
particularly marked in one specimen, but in all, indications of
same peculiarity exist. The vent is margined by a ring of v
long, straight hairs.

The limbs (Pl. II., III., IV.) are short and strong, the fur
tending down to the manus and pes respectively. The fore-li
terminates in a manus of most peculiar construction, the struct
of which is so distorted that it can hardly be understood with
previous reference to its osteology, and in the absence of thi
fell into error as to the order of the digits in my first desc
tion. It is so folded, that when seen in the position assun
by the preserved specimen, the two large conspicuous claws of
third and fourth digits conceal all the other parts from view, exc
the blunt and broad horny nail of the fifth, which is seen proj
ing at the posterior part of the base of the fourth. On the in
side of these, and separated from them by a deep cleft, which op
inferiorly and posteriorly, is a tough, leathery and much wrink
palm, from which emerge the slender claw-like nails of
pollex and second digit. Thus, owing to this folding of the ha
the digits may be described as consisting of two rows with a cl
between them; the outer comprising the third, fourth, and fif
and the inner the first and second. The wrinkled and ba
palm, corresponding to the latter two, covers them on their ou
surface as far as the roots of the claws; posteriorly it overl
them, and extends upwards to the base of the short nail
the fifth digit. On the dorsal surface of the hand, which fa
inwards, the outlines of the first and second digits are evide
and the fur, here thin and sparse, extends only to the me
carpal region. The claws of these two are long, slender, narr

and tapering, that of the first being the more so. The claws of the third and fourth are very large and strong, the former being 15 mm. x 4 mm., of uniform width and ending bluntly; the fourth, shorter but much wider at the base and triangular in shape, tapers rapidly to a point. The fifth is represented externally by a broad and stumpy nail.

The hind limbs (Pl. II., III., IV.) are also short and strong, and have the plantar surface of the pes turned almost directly outwards, so that its fifth digit lies in front. This surface is much wrinkled into several large baggy folds directed obliquely across the sole, and is covered with a leathery skin like that of the palm, which extends as far as the base of the nails, and even encroaches on their plantar surface. The claws of the hallux, second, third and fourth digit are concave on their plantar surface, and those of the third and fourth are curved both outwards and backwards. The fifth is represented by a strong and short stumpy nail, rather like that of the corresponding digit in the manus, and lies more towards the palmar surface than the others. The length of the fourth is six mm., and the others diminish in length towards the hallux. On the dorsal (inward) surface the course of the first four digits can be seen through the integument, and the skin covering them is free from hair as far upwards as the base of the metacarpals.

OSTEOLOGY.

THE SKULL.

(Pl. VI., fig. 1; Pl. VII., figs. 1 and 2.)

The outline of the skull, including the zygomata, is conical, with the occipital region expanded and well developed; anteriorly it tapers to the region of the exterior nares which are terminal, and, owing to the overhanging nasal bones, these orifices open downwards and forwards and have a quadrangular outline. The occipital plane is flat and almost vertical. Within the zygomatic arches the skull is constricted about the mid-region of the orbito-temporal fossæ, widening again considerably in the region of the juncture of the lachrymal and superior maxilla on each side. The vertex is smooth, without any median ridge and considerably flattened, and the bones throughout are exceedingly thin, papery and translucent.

The occipital foramen is almost circular, but slightly compressed laterally by the encroachment of the condyles. These also are compressed laterally and have their long axes running parallel and almost truly antero-posteriorly. From behind forwards (or from above downwards) their contour is almost semicircular, and their articular surfaces look backwards for their upper, and downwards

for their lower half. A line drawn touching the most post
parts of both condyles lies almost exactly in the occipital p

No indication of a separate interparietal exists, nor can th
line between the occipital and parietal bones be distingui
but at the juncture of the occipital plane with the vertex,
defining the limits of the former area, a well-marked a
semicircular occipital ridge occurs, which disappears a
level of the posterior (or upper) margin of the occipital con
From the occipital tubercle a slight vertical ridge runs
wards almost meeting the occipital foramen. On the vert
the skull, a ridge for muscular attachment runs forwards an
wards, and then downwards from the occipital tubercle, t
becomes continuous with the upper edge of the zygoma.
behind, and parallel to this ridge, are two smaller ridges
become merged into that just described at a point bef
reaches the zygoma. (Pl. VI. and VII., fig. 1.) As betwee
occipital and parietal bones, no delimitation between the par
and squamosals, or between the parietals and frontal, ca
distinguished.

In front of the skull, the sutures can be distinguished,
the shape and extent of the nasals, superior maxillæ, prem
and part of the lachrymals are as shown in fig. 1, Pl. VI
VII. In the position of the opening of the lachrymal can
well marked circular depression, due to thinning of the
but I am unable to detect any patent orifice. The infrao
foramen is large and transmits a very large nerve. The
cannot be made out as a separate bone, but, springing fro
malar region, opposite the penultimate molar tooth, proc
well marked zygomatic arch, so much compressed laterally thr
out that it forms a thin vertical lamina, very narrow in fron
gradually widening as it proceeds backwards, until, in its pos
half, it becomes relatively very wide; a portion of its
end enters into the formation of the articular surface fo
lower jaw, and forms a marked preglenoid prominence.
junction of the arch with the squamosal is close to the c
part of the latter, so that very little of the arch itself is f
by the latter bone. The length of the arch is to that
whole skull almost exactly as 1 to 3.

Behind, the glenoid surface is formed chiefly by the squa
which projects externally in the form of a reversely placed C-s
ridge, the lower limb of the ridge running forwards and
wards and bounding the upper and front part of the au
meatus, then, losing itself in the tympanic part of the au
bulla, which latter projects forward under the glenoid cavit

The auditory bulla (Pl. VI., fig. 1; and Pl. VII., fig. 2) i
and conspicuous, but has throughout exceedingly thin and

walls. It extends so far backwards that it abuts against the anterior half of the occipital condyles, and reaches forwards to a point corresponding to about the middle of the zygomatic arch. Its anterior third is formed by the alisphenoid, the middle third by the tympanic, and, into the formation of the remainder, both the mastoid portion of the periotic and of the exoccipital appear to enter, but the latter cannot be, with certainty, defined from the other elements of the occipital bone.

In the anterior part of the orbito-temporal fossa, the lateral parts of the frontal and the lachrymal project outwards and somewhat backwards, forming a prominence, instead of a hollow, in the orbital region, which has exceedingly thin walls. Behind this prominence, and corresponding to about the junction of the anterior and middle third of the orbito-temporal fossa, the skull is constricted by a shallow groove passing downwards and backwards, corresponding to that which usually marks out the division between the orbital and temporal parts of the fossa. Behind this groove the cranium bulges a little, and is then again constricted by a similar groove, which runs downwards and a little forwards, nearly meeting the other above the sphenoidal fissure. (Pl. VI., and VII., fig. 1.) Behind this again, the skull broadens very rapidly towards the posterior root of the zygoma, at which point it is widest. Posteriorly the contours converge till they meet the lateral edge of the occipital plane. Sutures between the bones on the side of the skull, other than those mentioned, cannot with certainty be distinguished.

In a view of the inferior surface of the skull, almost the whole extent of the foramen magnum is seen, which thus faces very much downwards. Anteriorly, the basioccipital is completely ankylosed with the basisphenoid, though the junction is well defined by a transverse ridge. There are no paroccipital processes, and the exoccipitals have been described as forming part of the auditory bullæ.

Besides the basisphenoid, parts of the presphenoid, pterygoids and palate bones enter into the formation of the roof of the mesopterygoid fossa, which is wide anteriorly, but much narrowed behind. Its lateral walls are thin and lamelliform, curving inwards at their inferior edges, and the pterygoids end in well-marked, slender and backwardly-projecting hamular processes.

The contour line of the hard palate, including the alveolar borders, gives a markedly pyriform outline, being very wide opposite the middle of the molar series of teeth and tapering anteriorly. The bony palate has a straight posterior border, and its surface is arched transversely; at its junction with the lateral surfaces of the face a sharp edge-like alveolar border is formed, which abuts on the outer borders of the teeth. The junction between

the palatal and maxillary elements cannot be distinguishe
that between the maxilla and the premaxilla only indistinc
Two small and slit-like posterior palatine foramina can be
out in the wet skull (spirit) which transmit small nerves, bu
are not distinguishable in the dry. The anterior palatine
ina are large and elongated. Besides these there are, in th
palate, other smaller foramina irregularly placed, as
several small circular or oval areas where the bone is
thinned. The posterior nares are compressed in a vertica
tion.

With regard to the foramina of the base of the skull, th
size of the parts and the impossibility of distinguishi
sutures make it a little difficult to be sure of their p
The condylar and posterior lacerated foramina can, howe
distinguished in the usual situation, and the large canal
carotid artery pierces the basiphenoid and passes almost d
upwards. The foramen ovale, foramen rotundum and sph
fissure are all distinct, the latter two being approximately
same size and both larger than the first. I could detect no
ate aperture corresponding to the optic foramen.

A view of the inside of the cranium, through the f
magnum, shows a relatively large and smooth-walled cavit
shape conformable to the external contour of the sku
bones of the vault being so thin that, with the aid of
lens, small type can be distinctly read through them. Th
of the cranial cavity, more or less flat, though rough at its
part, rises in front of the basisphenoid region into a well-
eminence, which slopes away on either side. Anterior
again, the floor is flat. The auditory bulla seems to
internally, and shows itself as a thin-walled hollow em
lying in front of what appears to be the petrous elem
the periotic, but as I have wished to preserve the specim
tact, I cannot be certain of its exact relations, or of other
of the skull which are not accessible to examination
sections.

In the mandible the rami are relatively wide, and wi
the molar region, narrowing somewhat in front and behin
front part of the inferior border slopes gradually upwa
wards the symphysis, at which the two halves are firmly
losed. At about the width of a molar tooth behind the
the series, the upper border of the jaw rises almost ve
into a strong triangular coronoid process, which
anterior surface in the form of a laterally compressed i
triangle, having for its base the width of the rathe
alveolar border. This surface is vertically groove
posteriorly to it, the process is suddenly narrowed to

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plate. The condyloid process, long and sloping very much backward, barely rises to the level of the coronoid, and its articular facet, slightly compressed antero-posteriorly, stands very little above the level of the teeth. The posterior border, in its lower half, becomes expanded, and curls forward so as to form a well-marked masseteric fossa. The angle is continued into a conspicuous, considerably incurved angular process, wide and strong at its origin, but rapidly tapering to a styliform extremity. There is a large inferior dental foramen at the point of intersection of the long axes of the coronoid and angular processes, also a wide and very shallow mylo-hyoid groove. The dental foramen corresponds to the space between the last premolar and first molar.

DENTITION.

(Pl. VI. and fig. 2, Pl. VII.)

Some variation seems to exist in the number of the teeth, more particularly in the premolar region of the lower jaw. The following description is that of a specimen in which they appeared most complete, but it is not the same as that figured in the plate, where one tooth, described in the text, is absent from the lower jaw, as will be pointed out in the proper place, but, in all other essential particulars, the description will apply to any of the specimens.

Maxilla.—Within the premaxillary boundary there are three simple conical or peg-like teeth, the anterior being the largest in all measurements, and having its axis inclined inwards towards its fellow of the opposite side, while the hinder two are nearly vertical. In one dry skull, evidently that of an old specimen, there is a distinct "mark" in all three; in another and younger skull the cutting surface of the most anterior is marked by a groove. Between these incisors there is an interval nearly equal to the width of a tooth of the series.

Just behind the premaxillary suture there is a small tooth similar to, but rather smaller than, the hindermost incisor, the apex of which is inclined a little forward. This, from its position, must be a canine; its apex, also, shows a mark in the old skull. Behind this are two teeth differing considerably in size, but of a similar type, which is quite different from those that succeed them. These two, I take to be the premolars. The anterior and smaller, with its characteristics less well shown, has the anterior part of its crown elevated into a small but distinct cusp, from which the contour of the crown slopes upwards and backwards to its posterior border, where there is a very slight indication of a posterior cusp; the surface of the crown between the cusps is slightly concave. The succeeding tooth is about twice the length and breadth of that just described. It is compressed

laterally*, and has very distinct anterior and posterior cusps former being much the more prominent. There is an almost s circular valley between the two, from which a wearing su slopes upwards on the inner and hinder face. In the closed this comes in contact with the outer surface of the first mol the mandibular set.

Four molars follow, and one description will suffice for three anterior, which resemble one another almost exactly in and shape; the hindermost is smaller and less complex.

Taking the first member of the series, which is that show Pl. VI., figs. 3—6, it is compressed antero-posteriorly mostly so in its mid region, so that the length of the long of the crown, which is about twice that of the greatest w lies exactly athwart the alveolar border. As seen exter (fig. 4), the prominent feature is a pointed, inverted trian cusp *(a)*, of which the apex corresponds to the centre of crown when viewed in plan. From the apex of this cu concavo-convex surface, showing signs of wear, trends upw and outwards to the angles at the base, where there two small but distinct anterior and posterior external *(b* and *c)*. Between these cusps is a groove, which extends tically to the alveolar edge. The internal face of this promi apical cusp passes vertically upwards as a smooth rounded b to nearly the level of the palate, then spreads out internally a concave, subtriangular, overhanging surface also showing of wear (figs. 5 and 6, *d)*. The concavity of this overha surface being due to the fact that it is bordered by a well-ma rim, which descends internally into an internal cusp *(e)*; the apex of this, the internal contour passes upwards to the of the palate (fig. 5, *p)* as a smooth border rounded from b upwards, and still more sharply so, from before backw The whole of this part of the tooth has somewhat the sha the upper bill of a parrot, if it were much blunted and ma have a rounded end instead of a sharp point, or a better si perhaps, would be the peak of a military helmet. The horiz level of this beak-shaped internal cusp is about that of the of the alveolar border, though, from the transversely arc trending of the palate away from this border it stands as below this surface as it is above the median pointed

* From the fact that this tooth is placed just where the narrow p the pyriform area, marked out by the alveolar border, suddenly bro into the wider end, the outer face of this tooth looks forward as w outwards. Instead, therefore, of speaking of it as laterally compres would be more correct to say that the axis of compression runs f point outside and in front to within and behind; or, in other word long axis of the crown if continued forwards would strike the canine opposite side. *(Vide* Pl. VII., fig. 2.)

Between the molars, the interval is about that of the antero-posterior width of a member of the series, and is about the same as exists between the front molar and last premolar. The hindermost molar, smaller and simpler than the others, is also compressed antero-posteriorly; still, it shows rudiments of the details just described, the suppression of parts being most marked in the beak-shaped internal cusp, which is here only feebly represented by a ridge with a narrow worn surface.

Mandible.—There are two peg-like incisors of nearly equal size sloping forwards and showing a "mark." The apex of the next tooth, when the jaws are closed, passes just in front of the upper canine, and belongs presumably, therefore, to the same category (fig. 11, *c*). Behind this come three teeth, which I take to be premolars. (Pl. VI., figs. 1 and 11). The most anterior, which is not shown in the figures being absent in the specimen from which they were drawn, is about the size of the canine, but has its front border elevated into a rudimentary cusp, and a wearing surface sloping inwards. Then follows a minute styliform tooth, scarcely as thick as the shaft of an ordinary sewing needle, and about half the length of that just described. This is represented in fig. 11 immediately succeeding the canine (*c*). The hindermost premolar is a more developed type of the first, and much larger. Its anterior border is raised into a pointed cusp, from which a wearing surface slopes backwards and inwards, and bears it at its hinder extremity a small posterior cusp. A small wearing surface, also, shows on the outer face of the tooth.

The four true molars which follow resemble one another, but diminish in size from before backwards; a horizontal section is approximately triangular, with the base inwards (figs. 7—10). The external border, corresponding to the apex, rises into a sharp pyramidal cusp (*a*), and so also do the borders corresponding to the angles at the base (*b*, *c*), only they are less elevated and more rounded. Between these three cusps is a concave worn surface. An interval equal to half the width of a tooth of the series separates the teeth of this order; but from the obliquity with which the teeth are set in the alveoli these spaces are not seen when the jaw is viewed at right angles to its long axis, the outer and hinder border of one tooth overlapping the space intervening between this and the one behind.

The hindermost tooth of all is the fourth maxillary molar, the external cusp of the last mandibular molar passing between the fourth and the third of the maxillary series, the penultimate mandibular molar between the third and second, and so on The external cusps of the lower molars play up and down in the intervals between the large pointed cusps of the upper series, and the concave triangular surface between the three cusps of the lower

molars can be brought to play upon the under concave surfa
the beak-shaped internal cusp of the upper molars, the whole
representing a very complicated cutting and grinding appar
In front of the molars the arch of the mandibular teeth
within that of the maxillary.

According to the above description, then, the dental formu

$$i\ \tfrac{3}{2}\quad c\ \tfrac{1}{1}\quad p\ \tfrac{3}{3}\quad m\ \tfrac{4}{4} = \tfrac{10}{10},$$

but as there are certain variations in the skulls at my disp
and in ignorance of the succession of the teeth, it is possible
this formula may require some modification.

THE HYOID BONE.

(Pl. VII., figs. 3 and 4.)

In one specimen this bone is represented by two flattened
like thyrohyals, osseous for the greater part, but cartilagi
at their laryngeal extremities. In front they touch in the mi
line, but are not ankylosed. They are joined by a flat, semicir
and cartilaginous basihyal. In another specimen, in which
thyroid had become largely calcified, the thyrohyals were stc
and shorter in front; these were completely ankylosed,
joined by a semicircular basihyal, as in the other case.

THE VERTEBRAL COLUMN.

Atlas (Pl. VII., fig. 5, *a*) free; neural canal almost circu
transverse and spinous processes rudimentary. The artic
surfaces for the occipital condyles, concave in the dorso-ve
axis, encroach somewhat on the ventral arch, which is furni
with a semilunar facet for the odontoid process of the axis.
posterior arch bears on its hinder surface a small facet f
corresponding surface on the fused spinous processes of the
ankylosed vertebræ which follow. The rudimentary transv
process carries on its posterior surface a triangular facet f
corresponding surface of the axis.

The five succeeding vertebræ are completely ankylosed, the
indication of the component vertebræ being the interverte
foramina for the spinal nerves, of which there are four. (Pl.
figs. 5 and 6 *c*.) The fused bodies form a bony mass, generally r
compressed dorso-ventrally, but having its lateral borders ca
considerably downwards and backwards so as to convert
under surface of the mass into a wide shallow groove; in th
terior part of this groove there is a slight median ridge. The ne
arches are also ankylosed, but their fused laminæ form late
compressed plates, pointing forwards, which are much short
an antero-posterior direction than the fused bodies. So also
the spinous processes completely fused into a single tubercul

prominence, which carries on its anterior surface a facet for the above-mentioned facet on the posterior arch of the atlas. The anterior border of the fused bodies is prolonged into a well-marked triangular, dorso-ventrally compressed odontoid process, of which nearly the whole of the inferior surface is marked with an articulating surface for the atlas. This anterior border carries, also, relatively large triangular or pyriform articular facets for the atlas, which extend nearly up to the base of the odontoid process.

The transverse processes of the ankylosed vertebræ are represented by a minute but distinct conical projection (omitted in fig. 5), which corresponds, in position, with the fifth and sixth, or fourth, fifth and sixth vertebræ, but it apparently contains, also, the fused representatives of all five. From this, a slender bony bar passes to a point about the middle of the lateral edge of the fused bodies, thus forming a sort of vertebrarterial canal. Posteriorly the fused mass presents a broad shallow U-shaped articular surface, which, in its central part, articulates with the body of the next vertebra, and by the lateral parts with the first rib.

The seventh vertebra (Pl. VII., figs. 5, 6 and 8) has a dorso-ventrally compressed body, which articulates with the bodies of the vertebræ in front and behind. Its neural arch is slender and ring-like, without any spinous process. The transverse process is well marked, and bears anterior articulating surfaces on the dorsal surface of its root, which face upwards. The posterior zygapophyses have their articular surfaces looking downwards.

In the eighth vertebra (Pl. VII., figs. 6 and 8) the body is similarly compressed dorso-ventrally. The spinous process is very long, and both it and the laminæ of the neural arch slope much backwards, so that a wide gap is left between this and the neural arch of the preceding vertebra, which inclines forwards. The transverse process, not so prominent as in the seventh vertebra, carries at its root an anterior articular surface which looks upwards. On its under surface, looking forwards and a little outwards, and extending inwards, so as to be continuous with the posterior articular surface of the body, is a surface for articulation with the first rib. Posterior zygapophyses, rudimentary, with their articular surfaces lying almost entirely on the internal surfaces of the root of the laminæ and, from the obliquity of these, facing much downwards as well as inwards. At the posterior part of the lateral border of the body, and continuous with its posterior articular surface, is a facet which, with a corresponding facet on the body of the next vertebra, constitutes the articulation for the head of the second rib.

Reckoning the vertebra, just described, as the first of the

thoracic series, fourteen follow which bear ribs; these bear a general resemblance to the eighth, with the following modifications.

There is a gradual diminution in length of the spinous processes, and those of the tenth to the thirteenth are the most backwardly inclined; up to this latter point they are slender and rod-like, or rather bayonet-shaped, but at about the fifteenth they begin to be compressed laterally, as well as to become shorter, wider and more vertical. The spinous process of the last thoracic is nearly as wide as high.

Their transverse processes are of uniform length till the eighteenth is reached, then they become progressively shorter, till at the twenty-second, the process is represented only by a ridge. That of the eighteenth is the last, to which a rib is fairly articulated, though in the case of the rib-bearing vertebræ which follow, there are ligamentous bands which attach the neck of the rib to the transverse process. Two contiguous vertebræ provide the articular surface for the heads of all the ribs, except the first, which has a more extensive articulation that will be particularly described, and the last two or three. Each vertebra supplies an equal area in the case of the second and third rib, but, in passing backwards, the articulating surface gradually trespasses more and more on the hindermost of the two contiguous vertebræ till, in the last two or three, it is furnished by the body of a single bone.

In the twenty-first or penultimate thoracic vertebra, the posterior zygapophysis becomes more distinctly marked, and the posterior articular surface is on it, rather than on the inside of the laminæ, as in the case of the vertebræ preceding, from the eighth to the twentieth. This surface is also more markedly convex instead of nearly flat, and looks downwards and outwards, instead of nearly directly inwards; the pair fit into two very concave depressions on the anterior zygapophyses of the last thoracic, which almost meet in the middle line. A similar description applies to the last of the thoracic series.

Metapophyses are distinct on the penultimate thoracic, and become still more marked on the last. Insignificant rudiments of paired hypopophyses, also, appear on the posterior part of the body of the last one of the series.

Four lumbar vertebræ follow (Pl. VII., fig. 9) having the general type of the last thoracic. Transverse processes, small on the first, become larger in the remainder; in the last two they are long, point forward, and have their extremities somewhat hooked ventrally. They spring from the junction of the neural arch with the bodies. The metapophyses, which made their appearance in the hindermost thoracic, become here increasingly developed in

serial line. The second lumbar carries a pair of ridge-like hypopophyses, but these are quite rudimentary on the vertebræ both in front and behind; and are not distinguishable on the fourth.

Reckoning as sacral vertebræ all that are ankylosed, these are six in number. The fusion is complete, but the number of the constituent vertebræ is revealed by transverse ridges on their ventral surface at the junctions of the bodies, as also by the foramina of exit of the spinal nerves.

The sacrum.—Pl. IX., figs 1—4. The conspicuous feature of the sacrum is an enormous development and fusion of the metapophyses of the constituent vertebræ, which, thus expanded and fused, form a roof, which overhangs the pelvis (figs. 1, 2 and 4 *mm*). This is widest anteriorly, where also it can be seen to be serially continuous with the metapophyses of the lumbar vertebræ; it then narrows slightly, and posteriorly, it widens into two diverging processes (fig. 2). With the under surfaces of the anterior and posterior extremities of this overhanging metapophysial roof are fused the ilia and ischia respectively.

The spinous processes (fig. 2 *s*) are also ankylosed, forming, in front, a keel-like ridge, but behind, the superior edge of this ridge expands laterally into a wide lamina, which, extending outwards, meets, or nearly meets, the fused metapophyses and thus forms either a completely closed canal, or, in the parts where the two elements have not completely met, a deep groove. Into this canal or groove, as the case may be, open large foramina for the posterior divisions of the spinal nerves. The transverse process of the first of the sacral vertebræ is like that of the last lumbar, but stouter and points rather more downwards. The remainder of these elements are fused into an arched lamina (fig. 1 *tr*) which is ankylosed with the ilium in front and the ischium behind. This lamina is perforated by large foramina for the inferior divisions of the spinal nerves.

The first sacral vertebra bears anterior zygapophyses with concave facets for articulation with the posterior zygapophyses of the last lumbar, and similarly, there are small zygapophysial processes with facets for the first of the caudal series (fig. 3 *pz.*).

The Tail.—The caudal vertebræ are twelve in number, the tenth and eleventh being nothing more than rounded nodules, and the last a plano-convex plate (Pl. V., figs. 1 and 2).

The bodies, of the first four or five, are rather elongated; the spinous process broad and distinct on the first two or three, subsequently diminishes in size to the fifth or sixth of the series, where it disappears as a distinct median process, and is afterwards represented by a minute tubercle on each side of the mid-line.

The transverse processes are flat and rather broad in the first

two, then narrow, but become longer in the next two. So far, they project horizontally, but the transverse process of the fifth points considerably downwards, and has its extremity tuberculated and hooked downwards and inwards, so that it almost meets the chevron bones. The same general features prevail in the sixth, and, in the subsequent caudal vertebræ, where the process exists, it becomes gradually shorter, and terminates in a rough tuberous knob.

There are hypopophyses fused with the bodies of the second and third caudal vertebræ; and, abutting on the junction between the third and fourth is a distinct and separate chevron bone, which is perforated by a canal. These exist at each subsequent vertebral junction, being very largely developed about the middle of the caudal series, and their largely expanded ventral surfaces are rough from the presence of grooves and ridges running in the direction of the long axis of the body. The chevron bones exist quite to the end of the tail, but, corresponding to the last three or four inter-vertebral spaces, they are little more than rounded nodules.

THE RIBS.

Pl. V., figs. 1 and 2. Pl. VII., figs. 5, 6, and 8.

There are fifteen ribs, of which seven are articulated to the sternum.

The first is a remarkable bone. (Pl. VII., figs. 5, 6 and 8). Very short and strong, it forms a powerful buttress for the sternum; it is very irregular in shape, being in general terms expanded at each extremity and constricted in the middle, the constriction being due to a deep notch on the anterior border; or, the rib might be described as being very abruptly bent on itself in such a way that the sternal end points both forwards and inwards. Its large, expanded and irregularly trihedral head is directly articulated with the posterior surface of the laterally-expanded and ventrally-projecting mass of the fused cervical group, which, at this point, represents the sixth. It is also articulated with the transverse process of the eighth, of which the articulating surface encroaches slightly on the body. There is also ligamentous connection with the body and transverse process of the seventh vertebra, the rib thus being very firmly fixed to a wide extent of attachment. The sternal extremity, bent forwards and inwards, as above mentioned, is flattened and very wide, and joins the lateral edge of the presternum, along its whole length, to its junction with the first segment of the mesosternum. (Pl. VII., figs. 5 and 6.) Sometimes there is complete ankylosis at this articulation, the position of the junction being shown by a bony ridge, and in one specimen, complete ankylosis has taken place on one side only.

The fourteen ribs which follow are all slender and rod-like. Besides the first, the sternal attachment of which has been described, six other ribs join the sternum by means of sternal ribs, which meet the points of junction of the segments of the mesosternum, the union of the second rib being at the meeting of the first and second segment, and so on.

The costal cartilage of each succeeding rib, does not directly meet the sternum, but joins that of its predecessor.

The sternal ribs, in the case of the fourth, fifth, sixth and seventh, are not completely ossified in their outer segments; thus, there intervenes between the end of the vertebral rib and the ossified part of the sternal rib adjacent to the sternum, an intermediate cartilaginous segment. (Pl. VII., fig. 5 *xxxx*). These cartilaginous parts of the sternal ribs are not, however, completely segmented off from the inner ossified parts; the failure in ossification is gradual, and the ossification, complete in the sternal extremity, becomes less and less complete in the outer segment, till eventually cartilage only stands in place of bone. The junction between the cartilaginous segment of the sternal rib and the vertebral rib is quite abrupt.

The heads of the ribs, other than that of the first, are articulated with the bodies of the vertebræ, as mentioned in the description of the spinal column; thus the head of the second rib abuts on the bodies of the eighth and ninth vertebræ, and so on. Following the first, the part in the other ribs corresponding to the tubercle is attached to the transverse processes by ligamentous union, which is close and intricate as far as the eleventh; in the remainder, the union is less close, as the transverse processes gradually diminish in prominence. As already described, the transverse process of the eighth vertebra is distinctly facetted for part of the articulation of the head of the first rib; that of the ninth is only imperfectly so, but beyond this no definite facets are evident, but merely roughened surfaces for the ligaments.

THE STERNUM.

(Pl. VII., figs. 5, 6, 7 and 8).

The sternum consists of a presternum, a mesosternum of six segments, and a ziphisternum. The presternum is remarkable on account of its strong and prominent keel, which projects downwards and forwards to an extent which is greater than its length in a fore and aft direction (fig. 6 *f*). The lateral wings, which are slightly concave on each side of the keel, articulate (or ankylose) with the first rib, as described under that head, the posterior end of the junction coming right up to, or even encroaching upon the concave articular facet on its hinder face for the first segment of the mesosternum. The inner, or superior, surface of

the presternum is smooth and concave from side to side; behind, it rises in the mid-line into a small eminence, which supplies most of the before-mentioned facet for the mesosternum, the remainder being furnished by the root of the keel.

The six mesosternal segments (fig. 6 *i*) are compressed from side to side, and slightly expanded at each end, where they articulate with one another.

The first two are of equal length, and each is nearly as long as the presternum, but the four segments which succeed are only about half as long as these. The sternal ribs abut on the junctions of the mesosternal segments, that of the second meeting the points of contact of the first and second. In the case of the second, third and fourth the abutment is directly at the side of the mesosternal junction; while in the case of the fifth, sixth and seventh the ends of the sternal ribs lie ventral to the mesosternum, and almost meet one another in this position.

The ziphisternum (fig. 7) is a slender bony rod nearly as long as the first segment of the mesosternum, having for its terminal portion a flat cartilaginous expansion.

THE SHOULDER GIRDLE.

(Pl. VIII., figs. 1, 1a, 1b and 3b).

The scapula is narrow for its inferior, or, in its natural position in the animal for its anterior, two-thirds, but wide superiorly (or posteriorly), owing to the rapid divergence of the glenoid and coracoid borders at their posterior ends. The suprascapular border is thus of considerable extent, and the angles at its junction with the glenoid and coracoid borders, respectively, form prominent hook-like process which turn forwards and inwards (fig. 1).

The mesoscapular spine is well developed (fig. 1 *s*). Rising from almost the whole length of the bone, it is carried forward to form a long acromial process, leaving a deep notch between this and the scapular neck; it is besides much inflected, so as to overhang the postscapular fossa.

The postscapular fossa, much wider than the prescapular, gives origin to a well-developed second spine which lies nearer to the glenoid border than to the mesoscapular spine. Near the glenoid cavity it runs almost flush with the glenoid border—indeed, at that part one might describe the glenoid border itself as being turned up to form the second spine. (fig. 1 *gb. ss).* The free edge of this second spine in parts so nearly approaches the edge of the overhanging mesoscapular spine as almost to convert the groove between them into a tube; as it is, it is an exceedingly deep canal (figs. 1., 1a., 1b.) Approaching the scapular neck, this second spine still further rises into a marked flat process, (fig. 1 *p*) which

gives attachment to a ligament passing to the hinder border of the acromion. Between this process *(p)* and the glenoid cavity is the neck.

The coracoid border terminates in a very small coracoid process (fig. 3b *c*) which blends with the margin of the glenoid fossa, and in fact may be said to share in the formation of the articular surface. It gives attachment to a coraco-acromial ligament. The subscapular fossa is slightly concave from the glenoid to the coracoid border.

The glenoid surface is subtriangular in shape, and concave.

A considerably elongated mesoscapular segment is connected with the acromial process, and continues this forwards and inwards (figs. 1, 3b *m.s.s.*). To its bevelled end is attached the clavicle.

The clavicle (figs. 1, 3b *cl.*) is a very slender, curved, styliform bone, which ends in an enlarged sternal extremity. This, however, does not reach the sternum, but it is continued onwards as a ligament about half a centimetre in length, which is attached to the anterior border of the keel of the manubrium sterni.

THE ARM AND FOREARM.

(Pl. VIII., figs. 2—5a).

The humerus (figs. 2—3b) is a stout, strong bone, with its inferior extremity very much widened from the great extension inwards of the internal epicondyle. The head is rounded, and there are well-marked external and internal tuberosities. The ectocondylar and deltoid ridges are well-marked, and the musculospiral groove wide and deep. No supratrochlear or supracondylar foramen. The trochlear surface is almost completely divided by a deep notch into two portions, of which that for the radius is the larger. The internal epicondyle terminates in a hook-like process.

The ulna (figs. 4, 5) is remarkable for its long and much incurved olecranon process, the length of the process being nearly as great as that of the shaft. The shaft, wide above, from before backwards, and grooved on its hinder surface, tapers to a slender rod below, which curves a little outwards and backwards, and has a small blunt styloid process. In the natural position, the ulna lies behind the radius for its whole length. The surface of articulation for the humerus is deeply concave from above downwards, and its inferior lip constitutes a coronoid process. The superior lip is also prominent. Externally is a concave surface, for the head of the radius, which is bounded superiorly by a prominent lip.

The radius is about half the length of the ulna, including the olecranon. Its head is considerably expanded, and so, also, is its inferior extremity, from which proceeds a styloid process. Its articulation with the ulna and with the humerus has

been sufficiently described. Below, the radius and ulna together articulate with the lunar, cuneiform, and a large bone which will be described as the scapho-carpal, the radius taking the greatest share in the formation of the joint.

THE MANUS.

The manus (Pl. VIII., figs. 5 and 5a) is so distorted, and presents so many departures from the typical structure, that I cannot, with my limited experience in comparative osteology, be quite certain of the homologies of the different parts. Its features are best seen from the palmar surface. Figure 5 represents that of the left side enlarged to two and a half times, and, in order that the details of the structure may be better shown, a large palmar sesamoid bone (fig. 5a) has been removed; the relations of this will be better understood when the other parts have been described. The central figure and most conspicuous feature of the hand is a large irregular bone which extends almost completely across the carpus, and which has its palmar surface raised somewhat above the level of the remaining bones. It is indicated in fig. 5 by *sc*, as well as by the two crosses nearest the radial side; a foramen pierces it from above downwards, the position of which is indicated by the curved arrow. Articulating with the radius on its extreme radial side, it occupies the place of the scaphoid, but from its relation to the digits, with all of which it articulates, it seems to represent also the carpalia (I—V), and I will therefore, for the sake of convenience in description, term it provisionally the scapho-carpal. Lying between it and the radius, and visible only from the dorsal side, is a small bone, not shown in the figure, about the size of a pin's head, which I take to be a diminutive lunar; succeeding this on the ulnar side, and articulating with the ulna, is a semilunar-shaped bone, which is doubtless the cuneiform *(cu)*. The scapho-carpal has on its inferior aspect, and towards the palmar surface, a small concave facet, which carries a metacarpal-like bone (fig. 5 *r*). This supports two phalanges of the second digit, the more distal terminating in a long narrow claw. To the same metacarpal, as well as to the base of the proximal of its two phalanges, is attached, by ligamentous connection, the slender representative of the pollex, which also is composed of two segments, the terminal one ending in a claw. These are the two digits which are, as has been described, folded over towards the palmar surface of the manus, and form the inner of the two rows which bound the palmar cleft. Immediately to to the dorsal side of the facet for the bone described above as the metacarpal *(r)* common to the second digit and pollex is another for, what appears obviously, the metacarpal of the third digit *(s* and *s)*;

this is articulated to, and carries, a single phalanx, which is fused with the long claw *(c)*. Still more to the ulnar side of the scapho-carpal, articulating with it and projecting beyond it towards the ulnar side, is a bone *(t)* very wide in a radio-ulnar direction, which seems a greatly widened metacarpal, for it is articulated to, and carries, the large triangular claw of the fourth digit *(d)*.

If, therefore, I am correct in these homologies, each of the third and fourth digits possess one phalanx only, with which is firmly fused the corresponding great claw.

Articulating with that described as the cuneiform is an elongated bone, pointing superiorly, which appears to be an elongated pisiform (fig. 5 *p*). Parallel to this, and lying so much to its dorsal side that it is partially concealed by the pisiform in the palmar view represented in the figure, is an elongated metacarpal-like bone (fig. 5 *u*), which, by its proximal extremity, articulates with the scapho-carpal. This I take to be the metacarpal of the fifth digit, and it together with the pisiform support at their distal extremities a broad stumpy nail (*e*).

Lying on the palmar surface of the manus is a considerable bone before alluded to, which appears to be a palmar sesamoid. As has been stated, it is not shown in position, for it would have obscured other parts, but it is represented separately, with its palmar aspect turned towards the observer (fig. 5a). By its forked distal extremity it articulates with two facets on the large claw-bearing phalanges representing the third and fourth digits. These are marked *y.y* in fig. 5, and if, in the sketch, they appear too wide apart to correspond with the forks of the sesamoid bone, it is because the two digits have been somewhat separated to allow of better representation. By the proximal extremity this sesamoid articulates with a surface having three facets *(x.x.x)*, two of which are furnished by the scapho-carpal, and one by the pisiform. From its position it forms a sort of buttress or prop for the third and fourth digits, and in the same way the pisiform forms a support for the fifth.

THE PELVIC GIRDLE.

(Pl. IX., figs. 1, 2, 3 and 4.)

The pelvis lies very obliquely, nearly approximating to the horizontal. There is no indication of separation between its constituent bones.

The ilium is rod-like and trihedral in its middle part, with its faces looking downwards and outwards, downwards and inwards, and nearly directly upwards respectively. Anteriorly these surfaces gradually widen, and eventually the bone fuses with the body, metapophysial and transverse processes of the first, with the body and transverse process of the second, and with the transverse

process, only, of the third sacral vertebra. Posteriorly, the narrow rod-like portion of the ilium widens towards the acetabulum. The pubic elements come together at a wide symphysis, and are completely ankylosed. The posterior edge of the pubic and the ischial portion of the pelvis diverge as they ascend, and the latter fuses with the metapophyses and transverse processes of the two last sacral vertebræ. The posterior outlet of the pelvis has a markedly triangular outline (fig. 4). The acetabulum is circular and deep, and has a wide cotyloid notch posteriorly; it is imperforate, but its internal wall is very thin. A round ligament exists.

The obturator foramen, nearly circular, is situated below and behind the acetabulum, and is about one-third of its diameter.

MARSUPIAL BONES.

These are two very small osseous nodules, slightly divergent anteriorly, which lie in the tendon of the external oblique muscles of the abdomen, close to their attachment to the anterior border of the pubic symphysis. They are scarcely visible without a lens, and are consequently liable to over-looked.

THE THIGH AND LEG.

(Pl. VIII., figs. 6 and 7.)

In the femur (fig. 6), the head is approximately spherical, but tapers somewhat to a blunt conical point; it is marked by a small depression for the round ligament. The neck is short and constricted, standing out almost at right angles to the shaft, and there is a small but conspicuous tubercle at the junction of the front border of the neck with the shaft.

The great trochanter is much compressed antero-posteriorly, and very broad from above downwards. The lesser trochanter is a small conical process pointing inwards and backwards, situated at the junction of the inferior and posterior border of the neck with the shaft (fig. 6 *l.t*). The latter is somewhat flattened from before backwards, and widens into an inferior extremity, which presents two condyles, separated in the posterior half of the articular surface by a deep and narrow notch. Besides articulating with the tibia a large portion of this articular surface, by its superior and front part, articulates with the large patella and the external condyle, on its outer side, also articulates directly with the fibula by a surface which is continuous with that for the tibia and patella.

The shaft of the tibia (fig. 7) is very broad, and expanded in an antero-posterior direction in the upper half, this being due to the projection forwards of the anterior border as a prominent ridge. The bone narrows gradually to the junction of the middle and inferior third where it becomes subtriangular in section. The

lateral surfaces of the expanded part are slightly concave, and the upper articular surface is much elongated from before backwards and deeply grooved in its front half for the patella. In the posterior part there is an articular surface separated into two facets by a notch. The inner, and larger, is concave; the outer, and smaller, is convex, and is placed upon an outwardly projecting process. Both of these are for the femur. On the outer and under surface of the projecting process, just mentioned, and continuous with that for the femur, is a small flat facet for the fibula.

The inferior extremity articulates with the fibula, and is prolonged into an internal malleolus.

The shaft of the fibula (fig. 7) is slender, lying so far behind the tibia, as to stand almost clear of its posterior border. Its upper extremity is expanded into two flattened, and almost hook-like processes, which project fore and aft, and, on the inner surface of the bone, at the junction of the shaft with these expansions, is an articular facet looking upwards and inwards, which is partly for the tibia and partly for the femur. Of the expanded processes, the anterior comes to a point, but the posterior terminates behind in a broad slightly inflected border. Midway between the two and immediately above the facet for the superior tibio-fibular articulation is a large foramen *(o)*.

Below, the shaft expands into an inferior extremity, which is prolonged into an external malleolus, and the tibia and fibula together furnish an articulation, concave from side to side, for the astragalus.

The patella (fig. 7 *p*) is relatively very large and irregular, and generally flattened from side to side for the anterior two-thirds; in the remainder it is somewhat laterally expanded. On its posterior face it has a large flat facet, which plays upon the inferior femoral articulation, as described under that bone. The inferior border is brought to a sharp ridge, which fits into the groove, described as existing, upon the front part of the head of the tibia. The outer surface is somewhat concave from before backwards; the inner rough.

THE PES.

(Pl. VIII., figs. 8, 8a, 8b.)

The pes departs so much less from the normal type than the manus, that I need only confine myself to a description of the parts which present peculiarities.

The calcaneum extends considerably backwards as a long bony spur (fig. 8 *ca*). The scaphoid (*sc*), deeply concave towards the heel, articulates in front with a considerable internal and small middle cuneiform (*ic* and *mc*). These two carry respectively the hallux and second digit. There is a large irregular cuboid (*cu*), which

may represent also the external cuneiform; it has articulating with it the second as well as the three outer digits.

The digits, five in number, all possess the normal number of bones; and their terminal phalanges bear claws, which have been sufficiently described in a previous paragraph.

The fifth metatarsal however is peculiar, and deserves special mention (fig. 8a). It is immensely expanded towards the plantar aspect, and projects also towards the heel as a flat and blunt unciform process, the hinder extremity of this projection overlaps the calcaneum for nearly half its length. On the inner side of the pes is a large flattened sesamoid bone (fig. 8b), which is attached to the foot by ligamentous union; this also projects sole-wards after the manner of a bilge-keel. This bone, together with the similar plantar projection of the expanded fifth metacarpal, converts the sole into a trough-like groove.

THE SENSE ORGANS.

THE EYE.

No trace of this organ is visible externally, or on removal of the integument, but on reflecting the temporalis muscle it shows as a nearly circular, black lens-like disc on the inner surface of the anterior part of the muscle; it lies directly on the periosteum of the lachrymal bone at a point immediately behind the exact origin of the upper margin of the zygomatic arch, which here begins abruptly with a sharp upper edge and makes a sharp curve downwards and backwards. (Pl. VI., fig. 1.) No structure resembling an optic nerve was visible with the dissecting lens, though, on reflecting the pigment spot from its bed, fine filaments, apparently of connective tissue, were observable stretching between it and the periosteum.

The diameter of the pigmented disc is about ·5 mm. Sections made through it with the Cambridge rocking microtome, show it to be composed of a mass of pigment enclosed in a capsule of fibrous tissue resembling that of ordinary sclerotic, and its innermost layers similarly contain pigment. The inner pigment is accumulated into a large opaque mass, which occupies the greater part of the interior of the capsule, particularly the peripheral region and that believed to be the anterior. In those parts where the accumulation is less dense, or where the pigment is absent, viz., in the posterior and axial parts, the mass can be seen to be made up of small granules of varying size, either darkly pigmented, or yellow and highly refracting. In these situations can be distinguished, also, numerous nuclei, staining readily with borax-carmine solution, which appear to be those of epithelium-like cells.

Closely adjacent to the fibrous capsule, and covering it to a considerable extent, is a glandular structure of the type of a serous salivary gland, which has, however, certain peculiarities of its own.

In those sections in which the effort was made, and I believe successful, to have them running truly in an antero-posterior direction, there is to be seen evidence of the existence of a relatively large cavity, sac or duct, situated immediately in front of that part of the fibrous capsule, which would correspond to the cornea in the normal eye; in fact the front part of the capsule forms the hinder boundary of the cavity in question. This showed clear indications of an epithelial lining which thus appears to cover the surface of the front part of the capsule in the same way as the normal cornea is covered by its anterior epithilium. The antero-posterior sections passing through the central regions of the disc show the contour of the fibrous envelope to be pyriform, and the posterior and smaller end is continued backwards as a band or bundle of connective tissue, in which, however, no trace of nerve structure can be distinguished.

It should be noted that the sections were made from eyes taken from a specimen which was not in good condition, and also, that the smallness of the object made it difficult to be quite sure that the sections ran truly in the desired directions. Thus, without further investigation, I cannot be absolutely certain of its relations, or of the morphological value of its constituent parts So far, however, I believe my description is correct.

THE EAR.

From the aperture of the ear, the external features of which have already been described, a fibrous or fibro-cartilaginous tube bounds the meatus to the auditory aperture of the bony skull. As I was unwilling to damage any of the limited number of perfect skulls at that time in my possession, I have as yet made no examination of the internal ear.

SALIVARY GLANDS.

(Pl. VIII., fig. 9.)

Below the meatus externus is a large flattened parotid gland, and to the inside of this, overlapping its inner edge and extending inwards so as nearly to meet its fellow on the opposite side, is an equally large flattened submaxillary, showing five or six well-marked lobes. The two glands of both sides form an almost continuous broad band of gland tissue stretching from one meatus to the other.

MUSCULAR SYSTEM.

I have not been able to devote any of the specimens as yet examined to a detailed examination of the muscular system, nor indeed were any, except one which I have been anxious to preserve, as nearly as possible, intact for future reference, in a very suitable condition for a careful investigation of the soft parts; but generally speaking the muscular system is very well developed, especially on the limbs, pectoral, dorsal and caudal regions. A large mass of nuchal muscles, shown by the dotted line *(l)* in Pl. V., fig. 1, passes from the trunk and reaches to the summit of the occipital region for insertion into the triple ridge described on the posterior part of the vertex of the skull. This muscular mass contributes materially to the obliteration of the neck that has been alluded to.

URINARY AND GENERATIVE ORGANS.

(Pl. IX., figs. 5 and 6.)

The long, straight and wide rectum, lying in the middle line of the body, opens into a cloaca, which receives, also, the genito-urinary products. The anal aperture of this is surrounded with long straight hairs. The urinary bladder, considerably elongated and narrowing from the fundus, lies on, and ventral to, the rectum, and into its posterior narrow extremity the ureters and vasa deferentia open close together, but the former are dorsal to the latter. From the bladder the first portion of the urethra passes posteriorly as a straight tube of considerable length, and then enters the posterior end of the penis, in which, with ordinary dissection, I was unable to distinguish separate spongy and cavernous portions. This organ shows at its root two divergent bulbs, which, coalescing into a single cylindrical body, passes backwards, lying on, and closely adherent to, the ventral surface of the rectal wall. Posteriorly, the penis terminates in a single-pointed extremity, which pierces, as it were, the cloaca, and when this is laid open the tip just appears lying retracted within a recess in its wall, which thus forms for it a sort of preputial sheath (fig. 6); out of this recess the organ can be drawn considerably. On the dorsal aspect of the point of the penis is the slit-like anterior orifice of the urethra, which thus perforates the whole length of the organ.

The testes are oval bodies, which lie between the muscular planes of the abdomen in a position corresponding to the anterior edge of the pubic symphysis; they are therefore prepenial. In the specimens before me there is no trace of an external scrotum, and the organ can scarcely be felt by careful examination from the outside of the body. In the notes forwarded to me by Mr.

Benham, however, it was stated that "the testes of the male are like those of a cat," which would seem to indicate that they are a prominent external feature. There is apparently a tunica vaginalis, also an epididymis closely applied to the body of the testis, from which the vas deferens runs a nearly straight course to the point indicated in the description of the bladder; both it and the spermatic artery pass through a ring-like aperture in the peritoneum lining the abdominal cavity.

The kidneys are suboval, with smooth surface, and close to them, on the inner side, lie the adrenals of considerable relative size; the course of the ureters is sufficiently shown in fig. 5, and their termination in the bladder has already been described.

On each side of the terminal part of the cloaca, lying embedded in the surrounding connective tissue, is an oval gland, nearly as large as the testis, from which three tube-like structures pass towards the cloaca. Whether any one of these is a duct I am unable to say, nor could I with dissection with an ordinary lens detect an opening within the cloaca, but they all passed towards it, as shown in fig. 5.

Marsupium.—In Mr. Benham's notes he described the female as possessing a pouch which opens backwards, and, in my own preliminary description, I have described such as existing in the following terms:—"About 15 mm. in front of the vent there is a pouch in the integument about four mm. wide, with the opening directed backwards, and having a depth in a forward direction of from four to five mm. The surface of this pouch is devoid of hair, but the bare area is surrounded by thick fawn-coloured fur, with a slightly reddish tint." See Plate V., fig. 3. The condition of this specimen, which was apparently the only female I had then received, made all observations in reference to soft parts of doubtful value.

I am now, however, able to confirm these statements by an examination of the specimens recently obtained, for, four of these are undoubtedly females. Two possess a pouch, which is so well developed as to suggest that it has recently been occupied, and in two the organ is small and rudimentary. In that in which the pouch is largest, a groove in the integument, bounded by two well-marked pillars, begins just in front of the anus, and leads uninterruptedly forward into a *cul-de-sac*, which readily admits a glass rod 5 mm. in diameter. This pouch terminates at a point about 15 mm. in front of the anal orifice, and it thus opens backwards. Sparsely scattered over the integument, lining the interior of the pouch, are reddish hairs; but examination with a hand lens did not enable me to detect any nipple or orifice. A narrow margin of somewhat bare integument

immediately surrounds the pouch, but outside of this the fur is especially dense and of a darkish red colour.

In the two specimens in which the pouch is rudimentary, a similar but much narrower groove leads forwards from the anus, and ends in a constricted *cul-de-sac*, which barely admits the end of a darning needle. The same area of dense red fur surrounds the region.

All four females are from one to two cm. shorter than the largest male in my possession; but, on the other hand, both the males of the last series are no larger than the average size of the four females.

Food:—The intestines of those specimens, the condition of which permitted an examination of the contents to be made, contained the debris of insects, amongst which those of ants were conspicuously recognisable.

In the preceding description of some of the organs no attempt has been made to treat the subject exhaustively. The condition of all the earlier specimens, except one, which I have desired to keep as far as possible unmutilated for future reference, rendered this difficult of accomplishment, and I have been satisfied in making out as far as I could such details as were most obvious, or of chief importance, in determining the affinities of the animal. Unfortunately, no information whatever can be given as to the brain, which, as might be expected under the circumstances, was, in every case, in a state which rendered an examination quite hopeless. As regards the later specimens, though I can plainly perceive that they are not in first-class condition, they yet appear to be much superior to all, except one, of the former series. These I have only examined superficially.

CONCLUDING REMARKS.

For the considerable delay that has elapsed since the publication in the Transactions of this Society, and subsequently in the correspondence columns of "*Nature*," of some preliminary notes on the structure of this new marsupial, I must seek the indulgent consideration of naturalists, both in Australia and in England, who have, not unnaturally, been looking forward to a more complete description of a new animal of the greatest possible interest from many points of view. No one has regretted the delay more than I have. In extenuation, I must be allowed to say that scientific workers in the old world may not quite realize the difficulties under which some of their colleagues in the new have to labour. Many of these, primarily teachers, are not only, without adequate assist-

ance, overburdened with routine courses of lectures of inordinate length, but have also thrown upon them large administrative duties in their self-imposed efforts to found and sustain, on a creditable footing, scientific societies and institutions in countries where, as yet, science meets with little general support or sympathy, and where its pursuit is often looked upon as an amiable craze. Lastly, the imperfections and deficiencies of our Libraries and Museums—though these are rapidly improving—still leave much to be desired in the way of literature for reference and material for comparison.

Under all these unfavourable circumstances, which perhaps are to be expected in a young community, it is not surprising that those of us who are teachers of science in Australia have hitherto suffered the humiliation of seeing so much of the work on purely Australian subjects done elsewhere. The scientific prizes of the investigator, of first importance, have not unusually been, so to speak, snatched from under his very eyes.

Such being the case, in spite of a strong appeal to have the work, involved in the present investigation, done in England, I was anxious that it should, if possible, be retained in the colony in which the discovery was made.

It was possible to desire this and at the same time to admit freely that the work might have been better done if undertaken by those whose vastly superior competence must be at once acknowledged. As an additional reason for this wish, of a somewhat personal character, it is not, perhaps, out of place to say that, being, since the discovery of the animal, either a member of the Council, or President, of this Society, a feeling of loyalty towards both it and the colony, strongly suggested that I should, by the destination of the paper, gain for both whatever scientific credit might accrue from its local publication. The delay would not have been so great had I not felt bound to avail myself of very favourable opportunities that presented themselves, of visiting remote parts of New Zealand and the little known regions of Central Australia, during two successive long vacations, during which periods I have leisure to undertake independent work satisfactorily. Indeed, as previously stated, the latter journey of over 2,000 miles, of which over 1,200 had to be performed by driving, or riding on horseback or on camels, was undertaken largely with the hope of obtaining a further supply of specimens of this animal. I think I may fairly offer the sucessful result of the journey, in this respect, as an adequate compensation for some, at least, of the delay, for which I am responsible, as I shall now be able to submit examples to the examination of more competent

zoologists than myself, and thus to afford an opportunity of inspection by those interested in the discovery.

As has already been stated, the generic name originally proposed was Psammoryctes (sand-burrower, Gr.), but during my absence in North Australia I was made aware through information emanating from my old friend and teacher, Professor Newton, of Cambridge, whom in this matter, as well as in many others, I have to thank for acts of kindly interest and encouragement, that this name had already been appropriated for another group of animals, viz., by Pöppig in 1836 for a genus of mammals, and again by Vejdovsky, in the Zeitschrift fur Wissenschaftliche Zoologie for 1876, for a genus of worms. Psammorycter, which is practically the same word, was used by Blanchard in 1840 for a genus of Diptera. Professor Newton suggested Notoryctes as being appropriate, in view of its Australian habitat, and this name is, I think, preferable to Neoryctes, which had been previously proposed by Dr. Sclater. Though I regret extremely that the original name is preoccupied, as its sand-burrowing habits are so eminently the characteristic feature of its life, I think the new one will be regarded as satisfactory. As to the specific name, the extremely rudimentary condition of its eyes at once recommended it as suitable.

In view of the remarkable peculiarities of structure presented by the sub-class Marsupialia, and of the fact that we find amongst it analogous representatives of most of the orders of Mammalia, it has seemed not a little remarkable that hitherto no marsupial has been found with mole-like habits. In Notoryctes we have such a form developed to an extreme degree, and I regret that the exigencies of publication and the desire not to increase the delay which has already occurred in the preparation of this paper, together with the disadvantages, under which we labour in our work, to which I have alluded, make it undesirable for me now to attempt to enter into the many questions of interest, which are suggested by the structure of so singular a type. Certain osteological comparisons with existing forms are at once obvious, but I believe these may also be made, in respect of the dentition, with that of some of the Mesozoic mammals, to which, unfortunately, I can only refer by plates. Into these important questions, however, I cannot, with the time and means at my disposal, now attempt, even perfunctorily, to enter; and I can only hope that the description, so far as I have given it, will enable others to form their own conclusions.

In a subsequent paper I hope to embody the results of a more detailed examination of the organs, for which I hope the specimens now at my disposal will provide sufficient material in a suitable condition.

In conclusion, my best thanks are due to Miss Rosa Fiveash for the very great pains bestowed upon the drawings which illustrate this paper. Accurately and carefully drawn to scale, they will in many instances supply useful information as to size and form, and render more intelligible my own imperfect descriptions. To Mr. H. Barrett, of the South Australian Government Printing Office, my thanks are also due for his careful reproduction of the plates, and to the Executive of South Australia for permitting the work of a scientific society to be done in a public institution.

Descriptions of New Australian Lepidoptera.

By E. Meyrick, B.A., F.Z.S.

[Read June 2, 1891.]

SYNEMONIDÆ.

Synemon.

Syn. leucospila, n. sp.

Male and female, 31-42 mm. Head, thorax, abdomen, and legs dark fuscous, somewhat sprinkled with whitish. Palpi whitish, above dark fuscous. Antennæ dark fuscous, ringed with white. Forewings elongate-triangular, hindmargin rounded, rather oblique; rather light fuscous-grey; base and anterior half of costa suffused with dark fuscous; an irregular suffused dark fuscous fascia before middle, formed of three rounded confluent spots, uppermost and sometimes others also margined posteriorly with an ochreous-white suffusion; a roundish dark fuscous blotch beneath costa beyond middle, posteriorly margined by an ochreous-white suffused band or series of spots; two rows of cloudy dark fuscous spots before hindmargin, and a third marginal: cilia grey, tips whitish or white. Hindwings blackish-fuscous; a roundish pale yellowish discal spot; a yellow-whitish subterminal band, not reaching costa or inner margin, often divided into four or five spots, of which the middle one is often very small or absent; a submarginal series of seven white spots, three upper small, others rather large, lowest suffused; cilia fuscous, tips white.

Geraldton, West Australia; abundant on the plains near the town in November. The species is very distinct by its white or whitish markings.

Syn. heliopis, n. sp.

Male and female, 27-35 mm. Head, thorax, and abdomen fuscous. Palpi snow-white. Antennæ dark fuscous, ringed with white. Legs fuscous, femora white beneath, tibiæ ochreous beneath. Forewings elongate-triangular, hindmargin strongly rounded, rather oblique; fuscous, sometimes rather darker in disc; a narrow oblique transverse white median discal spot; a very obscure suffused band of light grey scales extending beneath middle from base to beneath discal spot and thence along upper half of hindmargin to apex; a slightly curved band of about five subconfluent small ochreous-whitish suffused spots on upper hal

of wing at three-fourths: cilia fuscous. Hindwings blackish-fuscous, ferruginous-tinged; a small suffused orange discal spot; a very broad deep orange hindmarginal band, not reaching costa, suffused at anal angle, including a submarginal series of small subconfluent blackish-fuscous spots, becoming larger on lower half; a blackish-fuscous hindmarginal line: cilia fuscous.

Geraldton, West Australia; in November, five specimens. This and the two following species are nearly together, but certainly distinct; *S. heliopis* may be recognised by the narrower transverse discal spot of the forewings, the fuscous cilia, larger discal spot of hindwings, and very broad orange band, with a series of well-defined dark spots in both sexes.

SYN. AUSTERA, n. sp.

Male and female, 40 mm. Head, thorax, and abdomen whitish-fuscous. Palpi snow-white. Antennæ dark fuscous, ringed with white. Legs whitish-ochreous. Forewings elongate-triangular, hindmargin strongly rounded, rather oblique; pale fuscous, ochreous-tinged; veins partially marked with blackish-fuscous lines, an irroration of grey-whitish scales forming a band beneath middle from base to two-thirds, thence curved upwards to costa at four-fifths, and also a narrower band along hindmargin, partially confluent with preceding above middle; a triangular white median discal spot; a faintly marked ochreous-whitish suffusion preceding the subterminal band on upper half of wing, divided into spots by dark veins: cilia whitish-ochreous, with one or two fuscous lines, tips whitish. Hindwings dark fuscous; in female a suffused orange discal dot; an orange fascia extending from middle of wing to apex, somewhat dilated upwards; in female a suffused submarginal series of cloudy orange spots before upper two-thirds of hindmargin; cilia whitish, basal third fuscous.

Carnarvon, West Australia; in October, two fine specimens taken together in a damp place on the plain. Easily distinguished from the preceding and following by its larger size, lighter colouring, the triangular discal spot of the forewings, and the less extended orange colouring of the hindwings.

SYN. BRONTIAS, n. sp.

Male and female, 25-33 mm. Head, thorax, and abdomen fuscous. Palpi snow-white. Antennæ dark fuscous, ringed with white. Legs fuscous, sprinkled with white beneath. Forewings elongate-triangular, hindmargin obliquely rounded; fuscous, somewhat suffused with darker in disc, and sprinkled with grey-whitish below middle and towards hindmargin; an ill-defined roundish ochreous-white discal spot; a sinuate band of suffused whitish spots, separated by dark veins, at about two-thirds nearly

reaching costa and inner margin; two faintly defined series of elongate darker fuscous spots before and beyond this; cilia fuscous, mixed with whitish. Hindwings dark fuscous; an orange discal dot; a broad orange hindmarginal band, hardly reaching apex, suffused towards anal angle, including in male an undefined submarginal fuscous suffusion, in female a series of four or five cloudy dark fuscous spots; a dark fuscous hindmarginal line; cilia fuscous, mixed with whitish.

Carnarvon, West Australia; in October, four specimens on the plain. Somewhat smaller than *S. heliopis*, and distinguishable by the roundish discal spot of forewings, the two posterior series of indistinct darker spots, the series of whitish spots nearly reaching both margins, the cilia mixed with whitish, and the dark subterminal spots of hindwings represented in male by an undefined suffusion.

LIMACODIDÆ.

Momopola, n. g.

Antennæ one-half, in male bipectinated throughout, but pectinations on terminal half extremely short. Palpi moderate, porrected, with dense appressed scales. Forewings with veins 7 and 8 out of 9, 10 out of 9 below 7. Hindwings with veins 6 and 7 stalked.

Mom. miltogramma, n. sp.

Male, 34 mm. Head, palpi, thorax, and abdomen light orange, mixed or tinged with red. Antennæ greyish-ochreous, pectinations *a* 4, *b* 6. Legs orange mixed with red hairs, tarsi black ringed with white. Forewings triangular, hindmargin rounded, rather oblique; pale whitish-grey; costal edge reddish-orange; all veins marked with broad crimson-red streaks, paler posteriorly; some dark grey irroration towards base in middle; a small median discal spot of blackish irroration; two transverse sinuate streaks of blackish irroration, not reaching costa, first beyond middle, touching discal spot, second subterminal: cilia pale yellow. Hindwings pale rosy; cilia pale yellow.

Queensland; one specimen received from Mr. Diggles.

BOMBYCIDÆ.

Bombyx, *Schrk.*

Bomb. mioleuca, n. sp.

Male, 35 mm.; female, 50 mm. Head, palpi, thorax, abdomen, and legs mixed with dark fuscous and whitish hairs, appearing grey. Antennæ dark fuscous, pectinations ochreous-orange in male 10, in female 3. Forewings elongate-triangular, hind-

margin obliquely rounded; fuscous, mixed with whitish and dark fuscous hairscales; costal edge in male dark fuscous; two strong dark fuscous lines, first from quarter of costa to two-fifths of inner margin, rather irregularly sinuate, second from before two-thirds of costa to beyond middle of inner margin, with a slight angular dentation outwards above middle, and somewhat bent inwwards below middle; a small transverse-oval fuscous-whitish discal spot before middle, circled with blackish; an indistinct irregular subterminal series of darker spots: cilia whitish, barred with dark fuscous. Hindwings dull whitish; cilia whitish, barred with dark fuscous.

Mount Lofty, South Australia; a pair received from Mr. E. Guest, who has taken others.

LIPARIDIDÆ.

Darala, *Walk.*

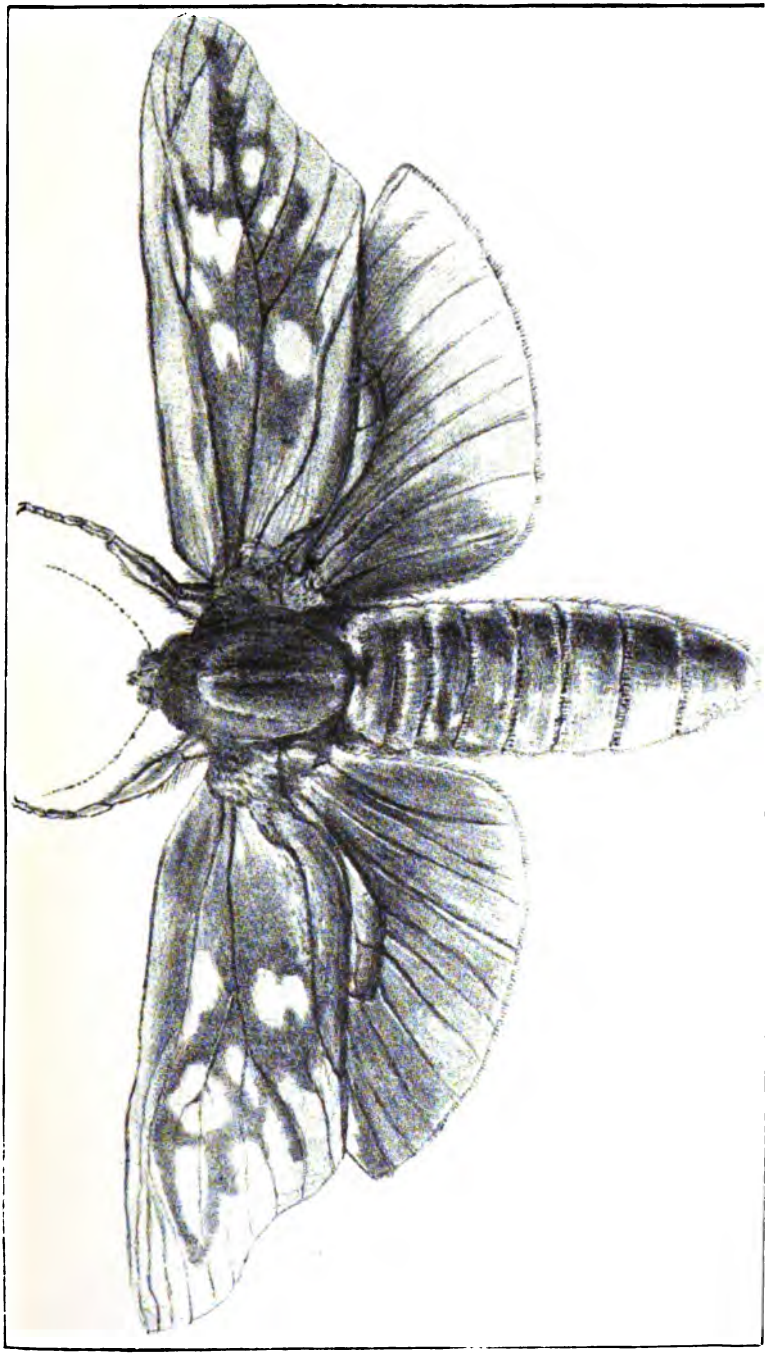
Dar. xantharcha, n. sp.

Male, 63 mm. Head fuscous. Antennæ blackish, stalk sprinkled with pale yellowish. Thorax blackish, somewhat mixed with whitish and ferruginous hairs. Abdomen ferruginous-red, anal-tuft yellow-whitish. Legs blackish, sprinkled with pale yellowish, hairs of femora partly ferruginous-red. Forewings triangular, hindmargin rounded, somewhat oblique; dark fuscous, densely strewn with white hairs, and a few bright ferruginous scales; three waved blackish-fuscous lines, first from one-fourth of costa to one-third of inner margin, sharply angulated above middle, second and third close together beyond middle, slightly curved inwards; a small, round, white black-circled discal spot above middle, immediately preceding second line; a moderate hindmarginal band nearly without white irroration, its anterior edge straight, dentate. Hindwings pale whitish-yellow, deeper towards base, with some orange hairs in submedian fold; a faint grey straight median line; a broad dark-grey hindmarginal band, irrorated with whitish-yellowish, anterior edge faint and preceded by a series of faint grey spots, and including a faint pale dentate subterminal line. Undersurface of all wings whitish, with a black discal dot and median line; disc of forewings orange, with white black-circled spot as above.

Koolunga, South Australia; one specimen in the collection of Mr. E. Guest. It is a handsome and extremely distinct species.

Dar. protocentra, n. sp.

Male, 48 mm. Head, palpi, thorax, abdomen, and legs dull brown-reddish. Antennæ whitish, pectinations reddish-fuscous (10). Forewings triangular, hindmargin rounded, little oblique;



COSSUS EDWARDSI.—*Tepper.*

R.C.F. del

H.B. lith.

J.L.C.W. del.

H.B. lith.

EXPLANATION OF PLATE IV.

FIGURES.

1. *Notoryctes typhlops*. Right manus, external aspect (x 2).

2. " " " " internal aspect as seen from a little in front (x 2).

3. " " " " external aspect as seen from a little behind (x 2).

Letter-references to figs. 1, 2, and 3 :—

a, claw of pollex.
b, " second digit.
c, " third "
d, " fourth "
e, short broad nail of fifth digit.

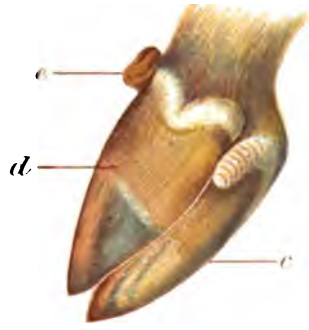
4. Right pes, plantar (posterior) aspect (x 2).

5. " " dorsal (anterior) aspect (x 2).

Letter-references to figs. 4 and 5 :—

a, claw of hallux.
b, " second digit.
c, " third "
d, " fourth "
e, short broad nail of fifth digit.

RCI



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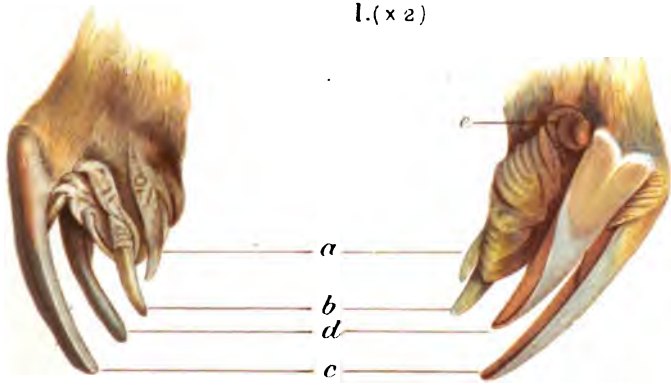

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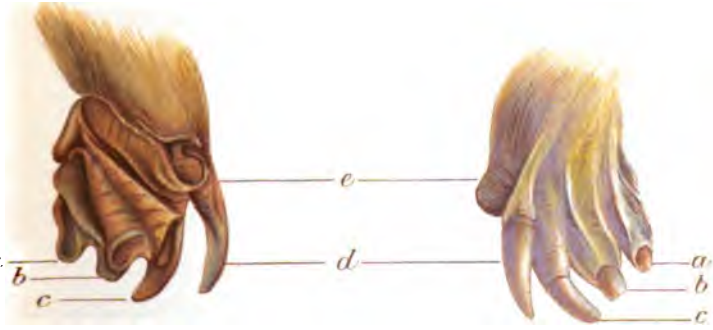


4.(x 2)

5.(x 2)

EXPLANATION OF PLATE V.

FIGURES.

1. *Notoryctes typhlops.* Skeleton (*nat. size*). For convenience the appendages of one side only are represented.

   e, first rib.

   f, keel of presternum.

   l, spinous process of eighth vertebra.

   m.s.s., mesoscapular segment of scapula.

   p, patella.

   The dotted line running along the spine marks the extent of the nuchal muscles.

2. Axial skeleton (*nat. size*).

   a, atlas.

   ac, acetabulum.

   c, fused cervical vertebræ (II.—VI.).

   e, first rib.

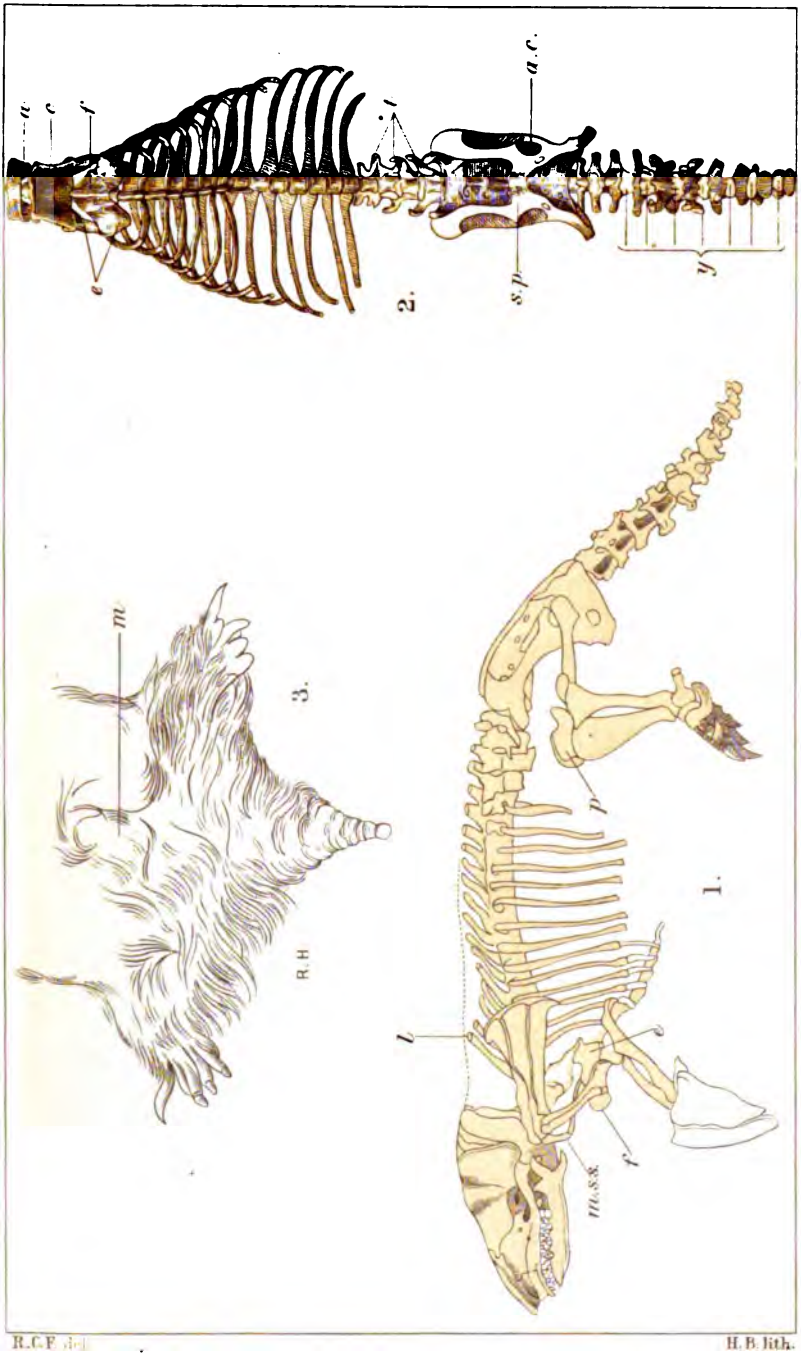
   f, presternum.

   t, transverse processes of lumbar vertebræ.

   s.p, symphysis pubis.

   y, chevron bones of caudal vertebræ.

3. Ventral view of posterior part of abdomen of first specimen received, showing indication of pouch *m*.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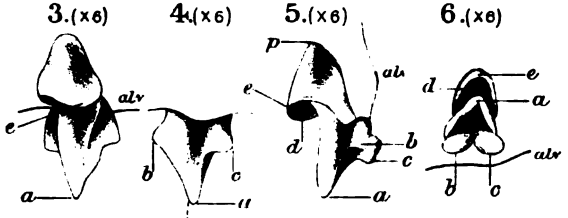
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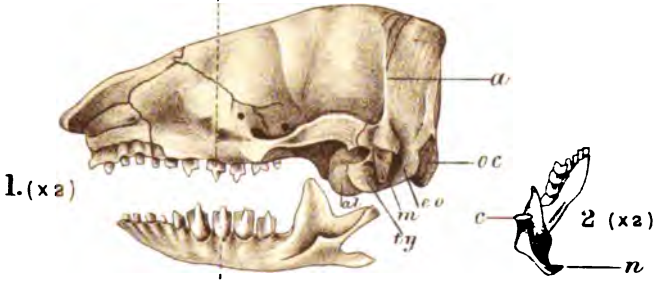
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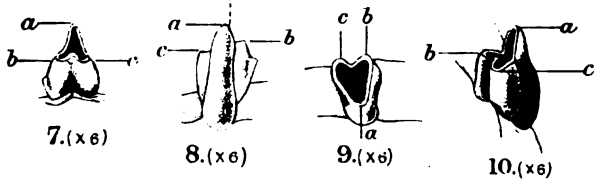
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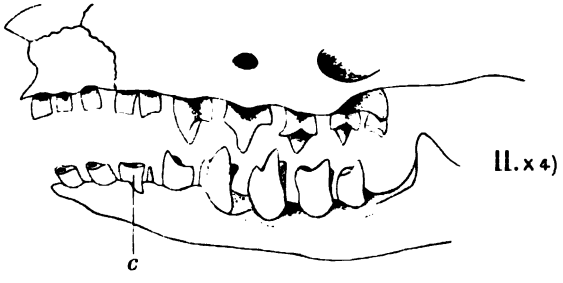
11.x4)
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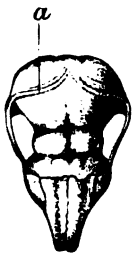
EXPLANATION OF PLATE VII.

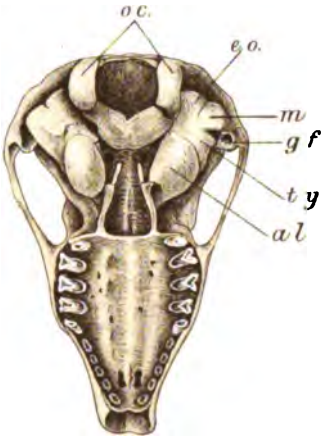
FIGURES.

1. *Notoryctes typhlops.* The skull, dorsal view *(nat. size)*.
   - *a*, the triple ridge on vertex for the attachment of nuchal muscles.
2. Base of skull (x 2).
   - *al*, alisphenoid.
   - *eo*, exoccipital.
   - *gf*, glenoid fossa.
   - *m*, mastoid portion of periotic
   - *oc*, occipital condyles.
   - *ty*, tympanic.
3. Hyoid bone (x 2).
   - *bh*, basihyoid.
   - *th*, thyrohyoid.
4. The same from an older specimen (x 2).
   - *c*, thyroid cartilage of larynx.

   Other references the same as in fig. 3.
5. Ventral view of cervical vertebræ and presternum (x 2).
   - *a*, atlas.
   - *b*, odontoid process of axis.
   - *c*, fused cervical vertebræ, II.—VI.
   - *d*, body of seventh cervical vertebræ.
   - *e*, first rib.
   - *f*, presternum.
   - *g*, second rib.
   - *h*, sternal segment of second rib.
   - *i*, second segment of mesosternum.
6. Lateral view of a portion of the anterior part of the axial skeleton (x 2).
   - *b*, odontoid process of axis.
   - *c*, fused cervical vertebra—II.—VI.
   - *d*, neural arch of seventh vertebra.
   - *e*, first rib.
   - *f*, keel of presternum.
   - *g*, second vertebral rib.
   - *h*, sternal rib of above.
   - *i*, mesosternum.
   - *k*, xiphisternum.
   - *xxxx*, cartilaginous segments of fourth, fifth, sixth, and seventh sternal ribs.
7. Xiphisternum, ventral view (x 2).
   - *k*, marks the junction of the bony xiphisternum with its cartilaginous expansion.
8. View of anterior orifice of thorax (x 2).
   - *d*, neural arch of seventh vertebra.
   - *e*, first rib.
   - *f*, presternum.
   - *l*, spinous process of eighth vertebra.
   - *m*, transverse process of seventh vertebra.
   - *n*, articular surfaces of first rib for the laterally expanded body of the sixth cervical vertebra.
   - *o*, articulation of first rib with presternum.
9. Second lumbar vertebra, anterior view (x 2).
   - *a*, spinous process.
   - *b*, metapophysis.
   - *c*, transverse process.
   - *d*, hypopophyses.
   - *z*, anterior zygapophysis.



1.



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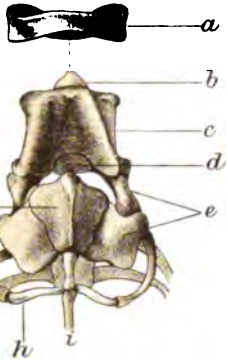

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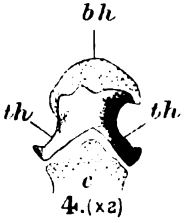

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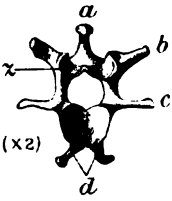

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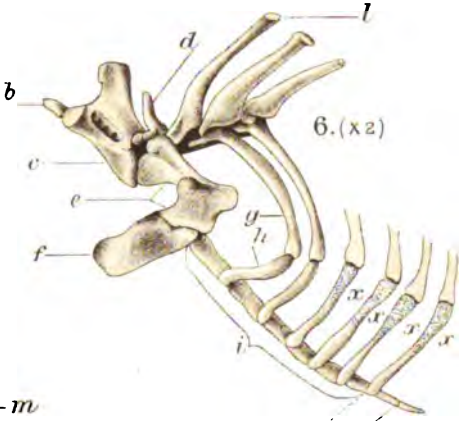
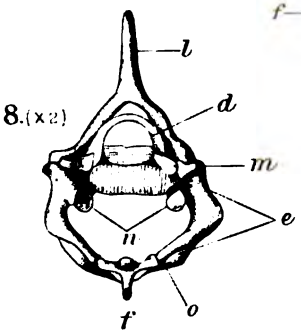
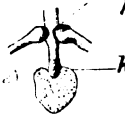






7.(x

R.C.F. del.

H.B. lith.

FIGURES.

x.x.x, mark the superior articulation surfaces for the palmar sesamoid bone.

y.y, (placed towards the bases of the large third and fourth claws) indicate the inferior articular surfaces for the palmar sesamoid bone.

The arrow passes through the foramen of the scapho-carpal.

5a. Palmar sesamoid bone, palmar aspect (x 2½).

x.x.x and *y.y*, indicate the position of its articular surfaces on the side away from the observer, which correspond with the surfaces of the preceding figure similarly marked.

6. Left femur, anterior aspect (x 2).

g.t, great trochanter.

l.t, lesser trochanter.

7. Left tibia, fibula and patella, external aspect (x 2).

a, points to the surface of the patella, with which it articulates with the femur. The edge of the surface only is shown.

f, fibula.

o, foramen through head of fibula. Just beneath this, on the side opposite to that shown in the figure, is the articular surface, which is partly for the superior tibio-fibular articulation, and partly for the femur.

p, patella.

t, tibia.

8. Left pes, dorsal aspect (x 2½).

a, *b*, *c*, *d*, *e*, } claws of digits in their proper order, *a* being that of the hallux

a, astragalus.

ca, calcaneum.

cu, cuboid.

ic, internal cuneiform.

m, fifth metacarpal.

mc, middle cuneiform.

s, sesamoid bone.

sc, scaphoid.

8a. The fifth metacarpal showing its large hamular expansion, external aspect (x 2½).

8b. Internal view of the large flat tibial sesamoid (x 2½).

9. The skin has been removed from the head and neck, showing the large salivary glands (*nat. size*).

a, meatus auditorius externus.

p, parotid.

s, submaxillary.

sm, tendon of sterno-mastoid.

EXPLANATION OF PLATE VIII.

FIGURES.

1. *Notoryctes typhlops.* Left scapula (x 2).
   - *a*, acromion.
   - *cb*, coracoid border.
   - *cl*, clavicle.
   - *g*, glenoid fossa.
   - *gb*, glenoid border.
   - *m.s.s*, mesoscapular segment.
   - *p*, *vide* text.
   - *s*, mesoscapular spine.
   - *ss*, second spine.

1a, 1b. Transverse sections through the scapula at points indicated by the corresponding dotted lines (x 2). For letter-references see fig. 1.

2. Left humerus, postero-external view (x 2). For letter-references see fig. 3.

3. Left humerus, antero-internal aspect (x 2).
   - *dr*, deltoid ridge.
   - *e.ep*, external epicondyle.
   - *gt*, great or external tuberosity.
   - *h*, head.
   - *i.ep*, internal epicondyle.
   - *lt*, small or internal tuberosity.
   - *r*, articular surface for radius.
   - *u*, articular surface for ulna.

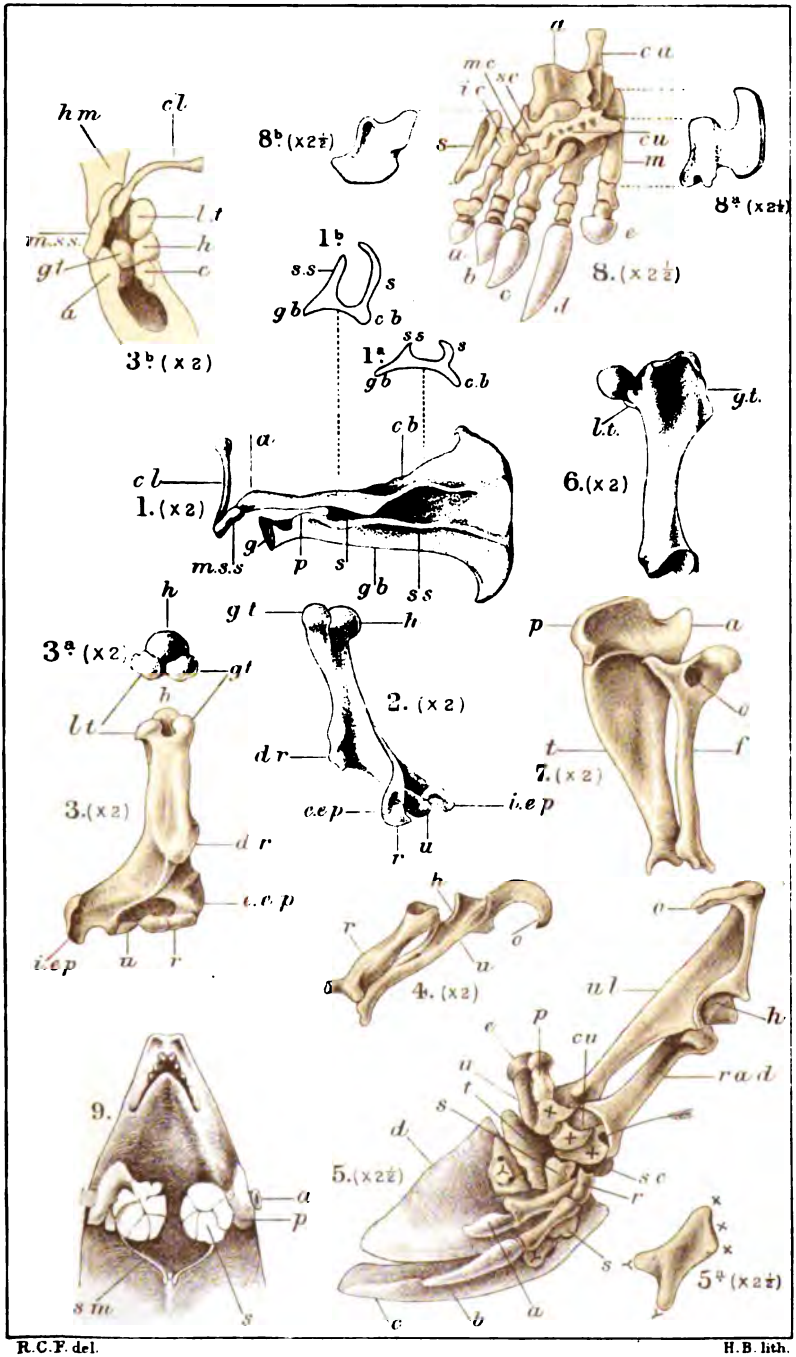
3a. End view of upper extremity of humerus (x 2). For letter-references see fig. 3.

3b. Superior view of parts about the left shoulder-joint *in situ*, with the ligaments left attached (x 2).
   - *a*, acromion.
   - *c*, coracoid process.
   - *cl*, clavicle.
   - *g.t*, external or great tuberosity.
   - *h*, head of humerus.
   - *hm*, shaft of humerus.
   - *l.t*, internal or small tuberosity.
   - *m.s.s*, mesoscapular segment.

4. Left radius and ulna. Postero-external aspect (x 2).
   - *h*, sigmoid notch for humerus.
   - *o*, olecranon.
   - *r*, radius.
   - *u*, ulna.

5. Left manus and forearm, internal or palmar aspect (x 2½).
   - *a*, claw of 1st digit.
   - *b*, " 2nd "
   - *c*, " 3rd "
   - *d*, " 4th "
   - *e*, " short nail of 5th digit.
   - *cu*, cuneiform.
   - *h*, sigmoid notch for the humerus.
   - *p*, pisiform. To this bone belongs the articular surface marked *x* nearest to *p*.
   - *r*, metacarpal common to the first and second digits.
   - *rad*, radius.
   - *sc*, the scapho-carpal of the text.
   - *s* and *s*, metacarpal of third digit.
   - *t*, " fourth "
   - *u*, " fifth "
   - *ul*, ulna.

(For continuation of Explanation of Plate VIII. see back).



R.C.F. del.

H.B. lith.

EXPLANATION OF PLATE IX.

FIGURES.

1. *Notoryctes typhlops.* Sacrum and pelvis, side view (x 2).
   - *ac*, acetabulum.
   - *il*, ilium.
   - *m*, metapophysis of the fourth, or last, lumbar vertebra.
   - *mm*, ankylosed metapophyses.
   - *o*, obturator foramen.
   - *s*, spinous process of third lumbar vertebra.
   - *ss*, spinous processes of first caudal vertebra.
   - *t*, transverse process of first sacral vertebra.
   - *tr*, ankylosed transverse processes of sacral vertebræ.
   - *tt*, transverse process of last lumbar vertebra.

2. Dorsal view of the sacrum and pelvis (x 2).
   - *az*, anterior zygapophyses.
   - *mm*, ankylosed metapophyses.
   - *s*, ankylosed spinous processes. These, meeting the metapophyses on the right side, form a completely closed canal. On the left side the two sets of fused elements do not quite meet, so that the canal is left open.

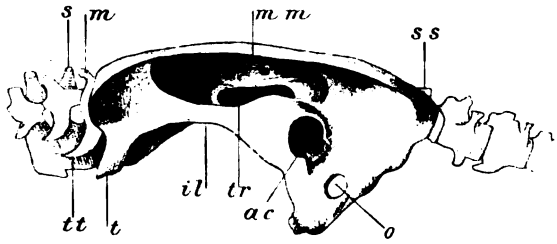
   The foramina are those of the dorsal division of the spinal nerves.

3. Ventral view of the sacrum and pelvis (x 2).
   - *ac*, acetabulum.
   - *c*, transverse process of second lumbar vertebra.
   - *il*, ilium.
   - *is*, ischium.
   - *pz*, posterior zygapophyses.
   - *sp*, symphysis pubis.

4. Outline of posterior outlet of pelvis (x 2).
   - *mm*, metapophysis.
   - *s*, spinous process.
   - *sp*, symphysis pubis.

5. Urinary and generative organs; (half diagrammatic); ventral aspect *(nat. size)*.
   - *a*, anus.
   - *ad*, adrenal.
   - *ag*, anal gland.
   - *b*, bladder.
   - *ep*, epididymis.
   - *k*, kidney.
   - *p*, penis, the point of which emerges within the cloaca from a preputial sheath formed out of the cloacal wall (vid. fig. 6).
   - *r*, rectum.
   - *t*, testis.
   - *u*, ureter.
   - *ur*, urethra.
   - *vd*, vas deferens.

6. The cloaca has been laid open by a dorsal slit, and the figure shows the point of the penis within it, slightly withdrawn from the sheath formed out of the cloacal wall, in which, ordinarily, it lies almost completely retracted.



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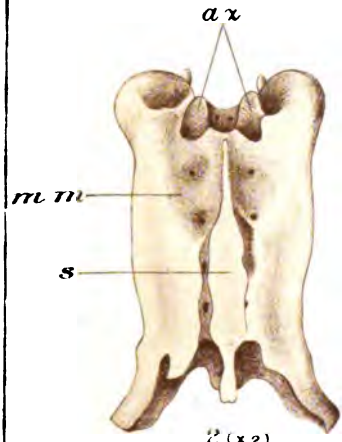

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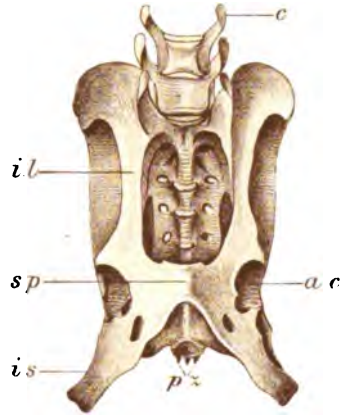

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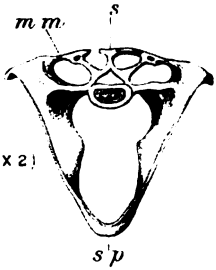

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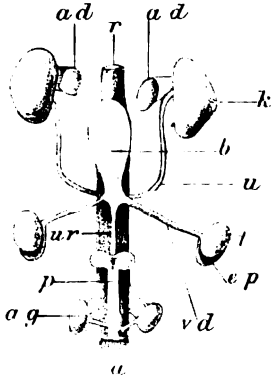

5.(x 2)

R.C.F. del.

H.B. lith

TRANSACTIONS AND PROCEEDINGS

AND

REPORT

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

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pt. 2

VOL. XIV., Part II.,

INCLUDING PROCEEDINGS AND REPORTS.

EDITED BY PROFESSOR RALPH TATE.

[With Fourteen Plates.]

ISSUED DECEMBER, 1891.

Adelaide:

W. C. RIGBY, 74, KING WILLIAM STREET.

Parcels for transmission to the Royal Society of South Australia, from Europe and America should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 35, Milk Street, Cheapside, London."

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LAELIA, *Stph.*

LAEL. EREMAEA, n. sp.

Male and female, 30-34 mm. Head and palpi pale ochreous-orange. Antennæ white, pectinations ochreous-fuscous, in male 14, in female 1. Thorax ochreous-white, anteriorly suffused with pale ochreous-orange. Abdomen ochreous-whitish, in female orange beneath and tinged with orange posteriorly above. Legs ochreous-orange. Forewings somewhat elongate-triangular, in male more elongate, hindmargin somewhat obliquely rounded; rather thinly scaled, whitish-ochreous, paler in female, costa more ochreous, especially in male. Hindwings in male whitish-ochreous, in female more whitish.

Duaringa, Queensland; five specimens received from Mr. G. Barnard. This species, apparently common, stands in some collections as *obsoleta*, F., but I think erroneously; Fabricius' species seems to be rightly identified as a *Porthesia* (the common white Acacia-feeding species).

PORTHESIA, *Stph.*

PORTH. ANACAUSTA, n. sp.

Male, 33-34 mm. Head white. Palpi orange. Antennæ whitish, pectinations blackish (*a* 12, *b* 14). Thorax, abdomen, and legs white; breast and anterior femora and tibiæ orange, anterior tarsi fuscous above. Forewings rather elongate-triangular, hindmargin obliquely rounded; white, very faintly rosy or ochreous-tinged; a small dark grey suberect mark at anal angle. Hindwings white.

Tasmania; four specimens received from Mr. G. Barnard.

PORTH. HOLOLEUCA, n. sp.

Male, 31-33 mm. Head white, lower part of face tinged with orange. Palpi orange. Antennæ white, pectinations light ochreous (*a* 10, *b* 12). Thorax, abdomen, and legs white; breast and anterior femora and tibiæ orange, anterior tibiæ fuscous above. Forewings elongate-triangular, without markings. Hindwings white.

Female, 34 mm. Head, palpi, antennæ, thorax, and legs white; antennal pectinations *a* 5, *b* 7; anal tuft orange, Forewings more elongate than in male, hindmargin more oblique; ochreous-white; a blackish dot in disc at three-fourths, and a smaller one rather near and directly beneath it. Hindwings white.

Mount Lofty, South Australia; Geraldton, West Australia; in November, five specimens.

PORTH. IOBROTA, n. sp.

Male, 23-25 mm. Head, palpi, antennæ, thorax, abdomen, and legs deep orange; antennal pectinations *a* 8, *b* 10. Forewings triangular, hindmargin rather obliquely rounded; ferruginous-orange, tinged with brownish, except towards anterior half of costa; in one specimen with ill-defined first and second lines of whitish-ochreous scales—first from one-third of costa to two-fifths of inner margin, somewhat angulated above middle, second from two-thirds of costa to two-thirds of inner margin, obtusely angulated in middle. Hindwings brownish-orange.

Queensland; three specimens (coll., Lucas).

PORTH. PYRAUSTIS, n. sp.

Male, 19 mm. Head, palpi, antennæ, thorax, abdomen, and legs orange; antennal pectinations 8. Forewings triangular, hindmargin obliquely rounded; rather dark ferruginous-fuscous, basal half strewn with ferruginous-orange hairs except along costa; costal edge orange: cilia wholly orange. Hindwings dark grey; cilia grey, becoming pale ochreous towards tips.

Queensland; one specimen received from Mr. G. H. Raynor.

NOCTUIDÆ.

AGARISTA, *Leach.*

AGAR. PLATYXANTHA, n. sp.

Male, 47-53 mm. Head and thorax as in *A. Donovani*; abdomen orange, two basal segments black, rest with narrow black basal rings. Forewings as in *A. Donovani*, except as follows:—All spots larger and yellower; a yellow suffusion near base below middle; a large yellow additional spot between veins 1 and 2 before anal angle. Hindwings as in *A. Donovani*, but fascia broader and yellower, preceded by a quadrate yellow discal spot almost confluent with it below middle.

Female, 40-48 mm. Forewings as in *A. Donovani*, but hindmargin less oblique; markings yellow, first discal spot almost obsolete, second more oval, a small distinct additional spot between veins 1 and 2 before anal angle, cilia not dotted on upper half. Hindwings as in *A. Donovani*, but fascia between veins 4 and 6 projecting further posteriorly.

Cooktown and Cairns, Queensland; six specimens (coll., Macleay); there is also one unnamed in the British Museum. I think the sexes are rightly placed together; the differences between them them are quite analogous to those found in *A. Kochii*.

AGAR. TETRAPLEURA, n. sp.

Female, 48 mm. Head, palpi, and thorax black, sprinkled with whitish-yellowish dots. Abdomen black, segmental margins whitish-yellowish, apex orange. Legs black, apex of joints white, hairs of coxæ orange. Forewings somewhat elongate-triangular, hindmargin rounded, somewhat oblique; purplish-black; a few scattered white scales towards base, forming a ring beneath costa; a rather narrow, straight, irregular-edged fascia of six partially confluent whitish-yellow spots from costa beyond middle to hindmargin above anal angle, but not quite reaching margins; a short line of a few white scales from costa at two-thirds: cilia purple-blackish, round apex snow-white. Hindwings purple-black; a nearly straight, rather narrow, entire whitish-yellow fascia from beneath costa at two-thirds to inner margin above anal angle, outer edge waved, and sinuate below middle; a small triangular whitish-yellow apical spot; cilia purple-blackish, round apex whitish-yellow.

New South Wales; I have one fine specimen of tl is very distinct species, of which I unfortunately omitted to record the locality when captured, now 13 years ago; but I believe it was on the hills above the Bulli Pass.

CALLIPYRIS, n. g.

Face rounded; ocelli present; tongue developed. Antennæ in male filiform, rather strongly ciliated (2). Palpi moderate, porrected, second joint with appressed scales beneath, projecting triangularly above towards apex, terminal joint short, obtuse. Thorax and abdomen without crests. Tibiæ rather densely scaled, not spinose. Forewings with veins 7 and 8 out of 9, 10 anastomosing with 9. Hindwings with vein 5 well developed, parallel to 4, 6 and 7 from a point. Probably allied to *Sophta* and *Sventia*.

CALL. DROSERA, n. sp.

Male and Female, 15-19 mm. Head antennæ, thorax, and abdomen deep reddish-ochreous, thorax and abdomen with brilliant silvery-metallic gloss. Palpi and legs orange, anterior legs reddish-ochreous. Forewings rather elongate-triangular, apex tolerably pointed, hindmargin forming a strong obtuse projection below middle on vein 3, concave above this and slightly sinuate below it; fuscous, more or less tinged with reddish-ochreous anteriorly and towards costa, irregularly strewn with brilliant silvery-metallic scales; a fine whitish line at one-third, white towards costa, angulated outwards above and below middle, inwards in middle; an oblique snow-white streak from costa beyond middle, emitting an obscure whitish line to three-fourths of inner margin,

angulated similarly to hindmargin; costal streak followed by a triangular orange costal blotch, containing two white dots on costa; hindmarginal area deep ferruginous mixed with orange, becoming orange at apex and anal angle, containing a submarginal streak of mixed bright violet and brilliant silvery-metallic scales: cilia ochreous-orange, terminal half paler. Hindwings with hindmargin waved, slightly bent below middle; orange-yellow, paler towards costa; a short erect streak of mixed dark grey and silvery-metallic scales from inner margin in middle, a similar streak of violet and silvery-metallic scales from inner margin above anal angle, and a third at anal angle; a suffused orange-fuscous hindmarginal fascia; cilia ochreous-orange, terminal half paler.

Brisbane, Queensland; Sydney, New South Wales; in September and March, three specimens, appearing to frequent swampy places.

THALPOCHARES, *Ld.*

THALP. BASILISSA, n. sp.

Male, 20 mm. Head pale yellow, front of collar white. Palpi rosy-whitish, terminal joint fuscous. Thorax deep yellow, with a whitish-rosy central dorsal stripe. Abdomen whitish-ochreous, yellow on back near base. Forewings triangular, apex rectangular, hindmargin bowed, little oblique; bright deep yellow; costal edge rosy on basal third; a fine straight white line from two-fifths of inner margin to three-fifths of costa, thence continued along costa to near apex; terminal half beyond this line bright crimson-rosy, slightly tinged with yellow-ochreous except anteriorly; a moderately broad straight yellow-ochreous fascia from inner margin before anal angle to near costa before apex, but not reaching it, marginal towards costa with two or three white dots on veins, and posteriorly with two or three black dots: cilia bright rosy, terminal half snow-white. Hindwings whitish, towards inner margin yellowish; a suffused grey hindmarginal fascia, becoming rosy at anal angle; cilia dark grey mixed with yellowish, and at anal angle with rosy, terminal half snow-white.

Queensland; one specimen received from Mr. Diggles; very distinct.

THALP. PYRASPIS, n. sp.

Male and Female, 14-17 mm. Head, palpi, antennæ, and thorax dark fuscous; palpi beneath and at apex of second joint whitish-ochreous. Abdomen dark fuscous, partially suffused with orange. Legs dark fuscous, apex of joints whitish-ochreous. Forewings somewhat elongate-triangular, hindmargin obliquely rounded; dark slaty-fuscous, sometimes mixed with reddish anterior half marked with several irregular black transverse lines,

bounded by a nearly straight black line from middle of costa to two-thirds of inner margin, forming a short triangular projection in middle; terminal half more or less mixed or suffused with whitish, usually forming a broad fascia, anteriorly sharply defined, posteriorly suffused beyond this line, and a more or less entire hindmarginal fascia, sometimes strongly mixed with orange: cilia dark fuscous, with a white patch at apex, and another above anal angle. Hindwings bright deep orange; a moderate dark fuscous hindmarginal fascia; cilia dark fuscous, terminal half grey-whitish, slightly rosy-tinged.

Duaringa, Queensland; received commonly from Mr. G. Barnard. This and the next species are allied together, but very distinct from anything else.

THALP. CHRYSASPIS, n. sp.

Female, 20 mm. Head, palpi, antennæ, and thorax dark fuscous. Abdomen dark fuscous, sides mixed with yellowish. Legs dark fuscous, irrorated and ringed with ochreous-whitish. Forewings elongate-triangular, hindmargin rather obliquely rounded, waved; fuscous, on posterior half purple-reddish fuscous; an irregular obscure darker edged line at one-third; a rather narrow dark fuscous median fascia, attenuated on costa, anterior edge straight, posterior edge rather projecting in middle; reniform spot obscurely indicated above this projection, sides partially blackish-margined; a paler dark-margined line at two-thirds, angulated above middle, margining median fascia on lower half; a waved paler subterminal line, sprinkled with white scales; cilia light fuscous, mixed with ochreous-whitish. Hindwings bright orange; a moderate dark fuscous hindmargined fascia: cilia fuscous, mixed with ochreous-whitish.

Duaringa, Queensland; one specimen received from Mr. G. Barnard.

RIVULA, *Gn.*

RIV. NIPHODESMA, n. sp.

Male, 19 mm. Head, palpi, and thorax light ochreous, mixed with white. Antennæ whitish-ochreous. Abdomen and legs pale ochreous. Forewings rather elongate-triangular, hindmargin rounded, rather oblique; rather deep ochreous-brown; a snow-white subcostal streak from base to apex, broadest in middle, so that lower edge appears curved; a black dot in this streak beyond middle; two short oblique white dashes from costa near apex; a slender white submarginal streak from anal angle to near apex, but not reaching it; a blackish mark at apex beneath subcostal streak, and a hindmarginal row of black dots: cilia grey-whitish, with numerous irregular rows of grey speckles. Hindwings

ochreous-whitish; a fuscous suffusion along hindmargin; cilia ochreous-whitish.

Cairns, Queensland; one specimen received from Mr. G. Barnard.

ELAPHRISTIS, n. g.

Face with slightly-projecting scales; ocelli present; tongue developed. Antennæ in male bipectinated, apex filiform. Palpi moderately long, porrected; second joint with dense, rather projecting scales; terminal joint short, obtuse. Thorax with small posterior crest. Abdomen with small basal crest. Legs smooth. Forewings with veins 9 and 10 out of 8. Hindwings with veins 3 and 4 from a point, 5 well developed, somewhat approximated to 4 at base, 6 and 7 from a point.

Nearly allied to *Acrarmostis*, but without the peculiar neuration of that genus.

ELAPHR. ANTHRACIA, n. sp.

Male, 16 mm. Head, palpi, and thorax blackish. Antennæ and abdomen grey. Legs blackish, posterior pair grey. Forewings elongate-triangular, hindmargin bowed, rather oblique; dark slaty-fuscous, slightly sprinkled with whitish; a small crescentic blackish discal spot; a fine black irregular line from beyond middle of costa to two-thirds of inner margin, edged posteriorly with ochreous-whitish except near costa, from near costa to middle bent outwards so as to form a rectangular space round discal spot; a marginal row of large black dots; cilia dark slaty-fuscous. Hindwings and cilia light fuscous.

Brisbane, Queensland; two specimens in October.

UROSTOLIDÆ.

I find it necessary to form this new family (referable to the group of the *Geometrina*, and allied to the *Boarmiadæ*) for the following singular genus. In general characters it is related to *Drepanodes* and allied genera, but differs widely from all *Geometrina* in the structure of vein 8 of the hindwings, a character of the highest importance; this vein is here formed much as in the *Drepanidæ*, and there may possibly be some genetic affinity with that family, though not immediate. In the obsolescence of vein 5 of the hindwings the genus agrees with the *Boarmiadæ*, and differs from all other *Geometrina*.

UROSTOLA, n. g.

Face smooth; ocelli present, concealed; tongue developed. Antennæ two-thirds, in male filiform, shortly ciliated. Maxillary palpi obsolete. Labial palpi moderately long, porrected, with dense rough projecting scales, terminal joint short, nearly con-

cealed. Thorax nearly glabrous beneath. Posterior femora in male with apical tuft of long hairs above, tibiæ somewhat dilated, containing tuft of hairs in groove. Forewings with vein 1*b* furcate at base, lower fork faint, 5 from middle of transverse vein, 6 from upper angle of cell, 7 and 8 out of 9, 9 from considerably before angle of cell; 10 out of 9, anastomosing with 11 and then with 9, 11 anastomosing with 12 before anastomosing with 10. Hindwings with frenulum developed; 1*c* absent, 5 absent, 6 and 7 widely remote, 8 anastomosing shortly with upper margin of cell near base, and closely appressed to 7 for a short distance beyond cell.

Probably a very early form of *Geometrina*, related to the ancestral form of the *Boarmiadæ*.

UROST. MAGICA, n. sp.

Male, 24-25 mm. Head and thorax fuscous, face dark reddish-fuscous, fillet whitish-ochreous. Palpi ferruginous. Antennæ pale ochreous, ringed with dark fuscous; ciliations one-third. Abdomen fuscous, sides paler. Legs dark fuscous, orange beneath, coxæ and posterior femora orange. Forewings triangular, slightly elongate, costa arched towards apex, apex nearly rectangular, hindmargin obliquely rounded, rather deeply sinuate inwards on upper half; light fuscous, tinged with ochreous and ashy-purplish, strewn with small obscure dark fuscous transverse strigulæ; costal edge orange, dotted with dark fuscous; an obscure irregular ferruginous-brown line from one-third of costa to before one-third of inner margin; a straight dark fuscous streak from two-thirds of costæ to beyond middle of inner margin, sharply marked anteriorly, suffused posteriorly; a faintly indicated irregular subterminal line, marked with a small round dark fuscous spot below middle; cilia pale ochreous-fuscous. Hindwings with hindmargin rounded, slightly bent in middle; color, strigulæ, and cilia as in forewings; a straight dark fuscous streak from middle of costa to middle of inner margin; a slightly curved series of dark fuscous dots at two-thirds; a small round dark fuscous spot towards hindmargin above middle, and another below middle. Undersurface of both wings deep orange, with numerous dark fuscous strigulæ: a median dark fuscous streak, and subterminal series of cloudy spots.

Brisbane, Queensland; Richmond River, New South Wales; two specimens.

On a Subterranean Water-Supply for the Broken Hill Mines.

By Samuel Dixon.

[Read August 4, 1891.]

Plate X.

In laying before this Society evidences of an unlimited supply of water for the treatment of ores in the Broken Hill line of mines, I trust it may not be considered out of place to explain why such a subject should be discussed in Adelaide rather than in the colony which furnishes it. In the first place, anything which would double the population at Broken Hill must be of great importance to the colony which produces the chief food-supply for that population; secondly, because a much larger proportion of the owners of these mines are resident in this colony; and, thirdly, it must be confessed, because of the neglect which the western division of New South Wales has always received at the hands of the Sydney Government. An instance of this unintelligible neglect has been greatly impressed on me in the extreme difficulty experienced in obtaining the necessary data for this paper; and a still greater instance is to be found in the fact that the richest silver-mines in the world remain without any geological surveyor to chart down the stratigraphical discoveries of the region, which would ultimately save the community thousands of pounds in exploratory shafts and drives.

During this past summer the very greatest difficulty was experienced in obtaining water for the smelters alone, and then not an adequate supply; and the limitation of the weekly output which resulted caused a corresponding drop in capital values, amounting to £3,000,000 alone on the Proprietary stock; and, although temporary supplies have been obtained, concentration is not yet resumed, and some mines have not even attempted a concentrating plant—as, for instance, Block 10, where, as appears from last report, the proportion of ore dumped for future treatment is as 8 to 12 of the ore now smelted.

The scheme known as the Stephens Creek Water-supply is solely dependent on the rainfall, and, in view of its very uncertain and limited quantity, it appears to me that, even should it successfully impound that rainfall, the consumption of fresh water for a population at present of 25,000, and still increasing, will,

with the requirements of the very numerous boilers and smelters, utilise all the water likely to be conserved.

Should this be the case, how is the tremendous amount of water required to concentrate the huge deposits of low grade ore to be provided? On this question depends the very existence of some of the mines, and the doubling of dividends by others; so that I ask for this paper the fullest consideration which the very great importance of the subject demands, and as it appears evident that, contrary to usual experience, the lode itself has utterly failed to supply the quantity needed, it becomes necessary to seek it elsewhere.

We know that the Cretaceous area, which supplies the magnificent artesian wells in this colony, Queensland, and New South Wales, lies far too far away from Broken Hill to be available; and with regard to the scheme for bringing water from the River Darling, not only is the distance very great, but the very intermittent supply contained therein has always seemed to me entirely prohibitory, an opinion intensified by the paper read by Mr. Russell before the Royal Society of New South Wales, November, 1886, and also by the testimony of my friend, Chas. Barritt, Esq., Mallara, River Darling, who writes me—"The river here stopped running in 1866 and 1884, but has several times been nearly stopping, but I cannot specify dates. I do not think the idea of water from the Darling is feasible, except at an enormous expense for conservation. The evaporation on large bodies of water is, roughly, six feet a year, and the Darling not to be relied upon. Twice during the last ten years have I pumped as much as was flowing in the river—once with horse-pump, with two and a-half-inch pipe, and once with steam-pump, four-inch suction. Once I had to dam the river and cut a trench to a waterhole for a supply."

Now, as to an unlimited supply. Flanking the Archæan rocks, which extend to the eastward of Broken Hill and the Barrier Ranges generally, lies a very large area of the Newer Tertiary deposits of intercalated clays and sands; this area is bounded on the north, as far as the Weniteriga Run, by the eastern extension of the Archæan rocks, and along their edge, and in a northern extension of the basin, Messrs. Riddoch have sunk several wells (see chart). Across the river, opposite Wilcannia, some sixty miles to the east, Mount Manara forms the eastern outcrop of the Archæan rocks, which gradually sink down until covered by the recent clays. The southern boundary is to be looked for at the overlapping of the Newer on the Older Tertiaries as represented by the Murray Cliffs. Professor Tate was the first to point out, in his paper on the "Basin of the Lower Murray River," read before this Society in 1884, and published in Vol.

VII. of its Proceedings, that at Overland Corner the Newer Tertiary is a fluviatile deposit resting unconformably against the escarpment of the older formation.

In support of this is the fact that at the cliffs, on the eastern bank of the River Darling, a few miles below the Anabranch Cutting, there is exposed at low water coarse red sandstones, which, accepting Sir A. C. Ramsay's opinion, as quoted by the Professor, must have been deposited in inland isolated waters; and I think close examination of the sandstone at Tanberry Point, still further up the river, will prove it to be the same formation.

The irregularly-stratified sands and clays between these two extremes—Tanberry Point and Overland Corner, some 150 miles south-westerly—afford further fluviatile evidence, as also do the brightly-coloured clay-cliffs exposed at Lake Victoria Head-station.

For our purposes, however, we will take a line westerly from Tanberry Point towards the boundary of this province. South of this line many of the deeper wells are salt. Though shallow, fresh-water basins exist, as, for instance, at Coombo Lake, the most westerly lake filled from the Anabranch overflows, a very ample supply of water was struck at 20 feet; the water contains a good deal of magnesia, and the clays forming the bed of the lake contain a large proportion of crystallised gypsum.

I should here like to hazard the opinion that at one time—a far distant period, no doubt—the Lachlan River emptied itself into the Newer Tertiary basin under present consideration, and that the present Willandra Creek is its representative.

This Newer Tertiary basin, thus roughly defined, measures at its widest 140 miles across. Within its area, water is always to be obtained in a bed of very fine white sand, always at about the same relative depth, and, allowing for local peculiarities, of the same quality, namely, slightly saline; beneath this stratum are other water-bearing ones, as is proved by the bores in Silistria and Aldborough Wells. As to the source of these waters there can be no doubt; and to make it perfectly clear it is necessary to give a short description of the topographical features which render the Darling River so interesting a study to geologists, though the region is indeed quite as interesting to botanic students from the same cause, viz., the extraordinary alternations of flood and drought.

The watershed of the Darling extends from lat. 33½° to 25½° south, and embraces the whole western flow of water between these parallels from the high table-lands, which skirt Eastern Australia at a distance roughly estimated as averaging 200 miles from the Pacific coast. The large rivers formed in

these mountainous table-lands run down rapidly until they reach the chief Tertiary plain of Central Australia, and there spread out in times of flood over hundreds of square miles, until reforming and gradually converging, they form, some distance above Bourke, that muddy, ugly stream, the Darling River, which flows thenceforth in a generally south-westerly direction for the remainder of its course through steep clay banks, some 40 feet high and 70 to 90 yards apart, until it junctions with the Murray; while along its course, for great distances, it is impossible to find a stone as big as a walnut. During heavy floods, which occur at very irregular intervals, it overflows its banks, and the water, with much fine mud in suspension, spreads over extensive plains, filling numerous creeks, lakes and billabongs, the only points not inundated being the peculiar red loamy sand-dunes. Between 60 and 70 miles above Wilcannia several creeks leave the river, and, flowing southerly, fill an extensive system of lakes which flank Mount Manara and the scrubby rises immediately to the south; ultimately the outflows gather into the Tallawalka, which turns abruptly west and enters the river below Menindie. Some idea of the extent of country thus inundated may be formed from the fact that the water continues to fill the most southern of these lakes three months after it has ceased to flow out of the river.

Immediately south of Menindie, a western system of overflow commences and fills Menindie, Cawndilla and Tandou lakes; and immediately below Netley Head-station the Anabranch also leaves the river on the western bank, and, after filling up an extensive lake system of its own, finally reaches the Murray 15 miles below Wentworth, where its opaque muddy stream mingles with the dark clear waters of the Murray.

As the floods subside these immense flooded areas dry-up and crack in every direction with numerous deep interstices, which, when another flood advances, serve as conduit pipes for the water to flow-down into the underlying sand stratum. Some conception may be formed of the extent to which this occurs when we find that it has been observed that for a whole week the flood has poured-down into one such crack without being able to advance further.

That these subterranean waters must total-up to something stupendous is clearly apparent when we recollect the hundreds of square miles over which storage goes on, flood after flood; and that several such basins must exist at different levels within the whole Darling basin, the varied quality of the springs oozing from the river-banks, at low water, puts beyond dispute. That some very big basins also exist between Bourke and the western slopes of the watershed appears very convincingly from Mr. Russell's paper, which I now quote:—

"For the past ten years, upon the assumption just referred to the discharge of the Darling River (at Bourke) has been taken as a percentage of the rainfall, and the yearly amount has varied from 5·81 to 0·09 per cent., the mean for the ten years being 1·46 per cent., a startling result, and one which I believe to be without parallel in any country in the world. . . . In Europe 20 to 50 per cent. of the rain flows away in the rivers, in England about 30 per cent., and here in a river—the Murray, with similar basin and rainfall to the Darling—25 per cent. of the rain flows down the river. . . . When we go into figures to see how much it is, we get a surprising result, viz., that it is not less than ten times, and probably 16 times what the river now carries away."—*Journal of Royal Society*, N.S.W., 1889, part 1, Vol. XXIII.

I propose to deal in this paper with the western portion of the basin, as delineated roughly on the chart, which for purposes of reference, I subdivide into the Menindie basin, the Topar basin and the Cuthawarra basin. My deductions of an unlimited supply of water are based on an examination of the wells sunk within these areas. Beginning with the Menindie basin, as nearest to Broken Hill, of its southern extension it is difficult to say more than already described, but the wells Middle Camp, Eaglehawk, North Ita on the Netley Run, and Wanga on the Burta Run, are all of the same general character, 200 feet and over before reaching the drift-sand which contains the water; of these the Wanga Well is the most western within the basin. The other wells hitherto sunk on Burta have been in the southern projection of the older rocks, where they gradually sink under the more recent formation, towards the Older Tertiaries as represented by the Murray cliffs. Speaking of the Menindie basin generally we may expect to find the centre of the depression, or rather its greatest depth, somewhere about the great lakes, not only because they occupy the lowest part of the present plain, but also because of their distance from the ancient rocks. On the other hand, the two semi-detached areas, whether viewed as separate from or as extensions of the main area, are probably the shallowest; for our purposes this does not much matter, as the Menindie basin measures 140 miles across, and from the absence of any outliers of the Archæan rocks whatever (certainly no traces have yet been found), we are justified in treating it as a whole, within whose boundary unlimited supplies of subterranean water exist.

The accompanying map, which sketches in approximately the boundary of the Archæan rocks and the Tertiary basin, is compiled from the official geological map of New South Wales, published by the Department of Mines in 1877, and from

personal information. A reference shows that the basin is widest easterly from Broken Hill, and that its nearest point to that place is on the Redan Run, and here the boundary of the two formations is evident to the most casual observer in the low ridge bisecting the run north-easterly and south-westerly, whilst northerly, towards the Quondong Well, is the most easterly of the Archæan rocks of the Barrier; hence all the wells to the west are comparatively useless, whilst all the eastern ones reach water in the characteristic fine sands. The Quondong Well just referred to, is formed by a bar of the ancient rocks intercepting the soakage of the superficial sands of Stephens Creek, hence its shallow depth (30 feet) and small supply.

The Redan Well, at the Head Station, is 270 feet to water in the drift-sand, here 50 feet thick. A bore was put down another 100 feet, and stopped in blue clay. The water did not rise above the level at which it was first struck, though at one point the hydrostatic pressure was so great that sand was blown up for 30 feet. Total depth of well and bore, 420 feet.

The Aldborough Well, lying still further towards the centre of what I have called the Menindie area, after penetrating the usual clay strata, struck water at 200 feet in a bed of sand, which proved to be six feet thick, yielding a good supply; it was then sunk through six feet of blue clay, and the water, which at first contained red mud, welled up to the level of the first flow. The well-shaft subsequently caved in.

The Kars Well was sunk many years since, it is 210 feet deep, contains a large supply of stock-water, is in fine drift-sand, and has a powerful engine, with seven-inch pipe. No attempt, by boring or otherwise, has been made, as far as I can learn, to test the presence of other water-bearing strata below.

The Silistria Well, situated towards the eastern edge of the Menindie basin, is a very remarkable one; sunk, as usual, through the various clay strata. At 270 feet water was struck in the fine sand, and a bore 131 feet deep was put down through alternate layers of blue clay and sand, each deeper layer containing coarser sand, and at the bottom very coarse sand and water-worn pebbles were found. The water, immediately it was struck, rose up to the level of the bottom of the well, and the force was so great as to send up pebbles with it. The water had a distinct sweetish taste, but is palatable for drinking; it is the deepest water so far struck within the area.

On reference to the chart, a large, almost detached, area of the Newer Tertiary to the north-west is shown, and may be called the Topar area. Particulars of wells sunk here I have not been able to obtain, except that water in fine sand was struck at the well marked towards its western edge. Its distance from Broken Hill

is greater than the nearest portion of the Menindie area, but this basin may be worth further investigation, as the Sydney main line of railway to Broken Hill must traverse it, and so would supply fuel for engines to raise the water. This Topar basin, as charted, suggests isolation, but evidence in this direction is entirely wanting.

Another well in this area is Eckerdoon, but its precise location is not to hand. In both wells, however, the supply is reported as large, and, as far as my present information extends, of the same general character as the wells in the Menindie area.

The Cuthawarra basin is the furthest north, and is immediately south of the Archæan rocks on which Wilcannia is situated, they form the southern boundary of that Cretaceous area, which contains the valuable artesian wells of Queensland, New South Wales and this colony. The wells sunk in the recent clays of the Cuthawarra basin prove that at about 80 ft. below the present bed of the river the flood-waters are also stored up in the sand stratum. Mr. Geo. Riddoch, of Weinteriga, acting on this idea, found that as long as he was within this area he could, by using his aneroid, predict with certainty the depth at which the water would be struck. As a rule, the water is good stock-water. That it may be considered to be an isolated basin appears probable, as the geological chart shows the old rocks as closing in on each side; and that the river has cut-through between the eastern and western extension of these rocks seems proved by the existence of the Christmas Rocks some distance up river above Weinteriga Head-station, and one of the few rock-bars on the Lower Darling.

The sum of the evidences from all these wells proves incontestably that unlimited water-supplies exist at a very moderate distance from Broken Hill. I submit this is proved undoubtedly, as every well, although miles apart, has within a certain defined area invariably struck water at about the same level (allowing for the thickening of the clay-beds consequent on increased altitude), in similar strata, and of similar quality; whilst from the bore at the Silistria Well, the only one reaching the best water, which is at the lowest level, namely, 400 feet, the hydrostatic pressure was so great that pebbles were ejected with the water up to 130 feet. The Aldborough Well, as far as it went, furnished corroborative evidence, also does the Redan Well, which did not bottom to the lowest water-level. The many wells spread over so wide an area, all of striking uniformity, testify to the inexhaustible quantity of the water contained in what one may call a subterranean lake; the length of which is 140 miles as proved by the wells sunk in the eastern extension, across the Darling River. Its breadth north and south we cannot define, in the absence of exact data for the south boundary, but, taking it only as 50

miles, we have 7,000 square miles of water-bearing beds to draw from.

To render the waters stored up in the Menindie basin available for the Broken Hill mines, there are no insuperable difficulties, and the cost need not exceed some £100,000.

The fine drift-sand of the upper water-bearing stratum has proved the cause of serious loss and a very large expenditure. It was found impossible to maintain a sufficiently deep hole to receive the well-buckets, and the attempt to do so usually ended in the well collapsing sooner or later. The pumping-engines now employed have, on the whole, answered very well, but to reach the best and the deepest water, it is only necessary to use iron caissons, double lined, as used in the erection of bridges where mud and soil must be penetrated before reaching a sound foundation.

Before fixing the actual site for the well, a preliminary survey of the natural features would be advisable to select the best pipe-track and sites for the positions of a few bores towards the centre of the basin; the bores will determine the most favourable strata for well-sinking, which could be done very quickly, as no stone or rock is to be passed through. A six-inch bore would be advisable, as the cores are certain to render valuable geological information. I should like to see a really competent consulting geologist engaged to report upon them, as it would add much to our scanty knowledge of the circumstances under which these wide-spread beds were deposited, and their relation to the period of deposition of the Murray Cliffs.

Now, as to the objection which has been raised as to the probability of the supply proving inadequate. Apart from the uppermost beds, where the water is slightly brackish, several others were passed through before reaching the gravelly beds, which contain the best water; and in the only bore which reached them, namely, that from bottom of the Silistria Well, the hydrostatic pressure was so great that the pebbles were shot up through the bore to the bottom of the well, a distance of 130 ft. This unmistakably proves the existence of a very large body of water, and, added to this evidence, we have to consider the very large area over which these Newer Tertiary beds extend, the thickness of the various water-bearing strata, as well as the supply obtained from Kars and Middle Camp Wells (although both these wells are only sunk a little distance into the first of these strata); all of which circumstances demonstrate the practically inexhaustible character of these underground waters, and more than corroborate Mr. C. S. Wilkinson's views, expressed in a private letter to me some time after this paper was first written, but before

he was aware of its contents. The date is 25th June, 1891. "But a few miles to the south of the main road the Tertiary deposits become thicker, and form the undulating plains-country between the ranges and Menindie. In these deep deposits in places artesian water of good quality is likely to be obtained. The formations consist of the recent Tertiary, gravelly, ferruginous clays like those at Caulker's Well; then below these the Older Tertiary lacustrine lignite-beds, resting on the Older Tertiary marine beds, in which the best fresh water may be obtained; possibly some of the Cretaceous beds may underlie these. Several years ago I prepared a map for the Lands Commission, showing the probable extent of these older water-bearing formations, and advised the putting down of bores for artesian water to the N.W. of Menindie, on the Broken Hill road between the Darling and the outcrop of the slates." This very accurate forecast is completely verified by the facts above-mentioned. As to the possibility of the Cretaceous beds being found underneath the Older Tertiary, I can only say that up to the present, as far as I am aware, no evidence pointing that way has been discovered.

Annexed are two estimates of the cost of utilising the water for the mines at Broken Hill. The first is by an eminent mining engineer, and the second is by the representative of Messrs. Simpson & Co., the makers of the triple-expansion Worthington pumping-engines. Each provides for the delivery of 1,000,000 gallons per day on the mines, and the distance is taken at 26 miles, neither would exceed £100,000. And the enormous commercial advantages which are evident and may be grouped under the following heads, apply to all the mines more or less, though it seems superfluous to mention them :—

1. Concentration of the large bodies of low-grade ores will add very largely to the weekly output without increasing the cost of fuel.

2. Amalgamating kaolin ores, saving £3 to £4 per ton on some.

3. Leaching.

4. Making it possible to condense the fumes.

5. Water-jackets and boilers will last much longer.

No. 1.

ROUGH ESTIMATE OF COST—THREE PUMPING-STATIONS.

2,100 tons 18-inch wrought-iron pipes (for 26 miles) ...	£53,200
Engines and pumps at well	4,500
Six pumps for stations (duplicates at three stations) ...	6,000
Stop, retaining, and relief valves and three feed-pumps	1,050
Boilers	3,100
Pipes and fittings to pumps	500
Erection of boilers, pumps, and buildings	3,500
Material, trenching, and laying pipes	5,000
	£76,850

Above prices f.o.b., exclusive of transportation and dams or tanks at stations.

No. 2.

APPROXIMATE ESTIMATES.

One well (400 feet deep), one vertical engine to pump into reservoir (to raise one and a-half million gallons in 24 hours from 270 feet); two horizontal triple-expansion engines (each to raise half a million gallons in 24 hours against a total head of 800 feet); four 96-h.p. boilers, traveller, feed-pump, &c.; engine and boiler-house, chimney-stack, and engine foundations; reservoir to hold 5,000,000 gallons, and all necessary valves (reservoir of stone or concrete)—for the sum of £44,500.

If a dam can be made the price above could be reduced to £28,500.

As there is abundance of clay in the country, we may take the latter estimate £28,500

Add pipes from first estimate	53,200
Laying pipes and material	5,000
	£86,700

Add to this freight for pipes to Port, and railway charges, and delivery on the ground, and railway and delivery charges for engines and pumps.

Consumption of coal six to seven tons per day.

The Aborigines of the Upper and Middle Finke River: Their Habits and Customs, with Introductory Notes on the Physical and Natural-history Features of the Country.

By Rev. Louis Schulze, Missionary.

(Communicated by the Honorary Secretary.)

TRANSLATED FROM THE GERMAN MANUSCRIPT BY J. G. O. TEPPER.

[Read April 7, 1891.]

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I. THE COUNTRY.

1. Physical Features and Soil.

The basin of the upper and middle River Finke is situated between the 23° and 25° S. lat. and 132°-134° E. long. It is an undulating plateau, gradually rising from north to south, and crossed by two main ridge-like ranges. There are several minor ones as well as isolated mountains, as, for example, the Waterhouse Ranges in the east, the Gosse Ranges in the west, &c., but which are virtually offshoots of the main chains. The northern range, called *Merena* by the natives, is the more lofty, its highest peak being said to be 3,800 feet above sea-level. At a distance, when viewed from the south, it presents a majestic appearance, but on a nearer approach this impression vanishes, owing to the gradual elevation of the intervening country. This range forms

the watershed of the interior of Australia, the streams flowing north on one side and south on the other. The River Finke, with a mainly south-easterly course, together with its tributaries—namely, Rudall-Creek, Ellery-Creek, the Hugh, the Todd, &c.—take their rise here, but not from springs. Though there are a few springs in this range as well as in the southern chain, they do not produce an overflow, but form swamps or ponds. Even when in winter the water does commence to run, the stream, after a course of a few hundred yards, is absorbed in the sand. It requires heavy continuous rain to produce a steady flow. Dry sandy water-courses are the prevailing characteristics, studded with Eucalypts or shrubs. The waterholes after a flood offer a welcome change, but these in time gradually dwindle and disappear during long-prevailing droughts. At these localities, however, water may be obtained by digging. The tall Eucalypts furnish the clearest indication of a water-course, both as to its channel and overflow; for this latter may be up to half a mile wide, or over a mile at some places, and is always overgrown with these trees. They are generally at a distance from one another, but in a few places form a close forest.

The southern chain, or Krichauff Range, here usually called the James Range, and by the natives *Ulamba*, is much broken in some localities, like the northern one, the highest point rising to a height of about 1,500 feet. It is crossed by the Finke River and several of its tributaries descending from the MacDonnell Ranges to the northward. Its own waters run into the Finke River in larger and smaller river-beds. The largest of these is the Palmer, with its tributaries descending on the southern flank with a south-easterly direction. On the largest of the latter, the Walker, a few miles above its junction, is situated the cattle station Tempe Downs. Where the Finke River enters the range is the Mission station—Herrmannsburg. Some 40 miles east, at the entrance of the Hugh River into the Waterhouse Range, is the Owen Springs Station, and in the eastern part of the MacDonnell Ranges, on the River Todd, are the well-known Alice Springs.

The scenery in the MacDonnell, as well as the Krichauff Ranges, is at some places most striking and picturesque. The finest of these is along the course of the Palmer River in the Krichauff Range, about 10 miles from the mission station, Herrmannsburg, where there are hundreds of Fan-palms, whose slender stems, a foot in diameter, rising straight and tall, bear aloft a beautiful, globular crown of leaves, some 30 feet in diameter. Within both Ranges are plains, overgrown with bushes like those of the elevations and outer plains around. After heavy rains good grass grows in places, but most of it is

extends for miles, resembling in appearance a waving field of corn. The soil is chiefly a red-colored loose sand, blown into hills and even chains of hills, between which extend plains of dark-grey loamy soil. Extensive limestone rises are also seen. The soil is passable, but the rainfall is too scanty. After rain herbage grows upon the red sand and the limestone hills, wherever the Porcupine Grass will allow it. The plains, however, are the most fertile.

2. Climate.

A clear sky, bright sunshine, very great heat, and long-continued droughts usually prevail. The idea of the four seasons in equal proportions is scarcely applicable here, for both spring and autumn may be very hot. The hottest months are December, January, and February, the last two being the worst, as the heat then continues day and night with hardly any intermission for two or three weeks. The temperature rises usually to 112 deg. F. in the shade of our reed-thatched verandah, exceptionally even to 115 deg. F., and sinks often scarcely below 90 deg. F. in the morning. After sunrise it again rises rapidly, and is frequently above 100 deg. F. at 9 a.m., and the same at sunset. In the spring months, viz., October and November, the heat is often as high as 110 deg. F., but lasts only three days, being produced by the north-west winds. The pleasant south-east wind then prevails for several days until again overpowered by the former. The north-westerly wind usually fills the air with dense clouds of dust, making things invisible at a hundred yards distance. The south-easterly wind acts frequently in the same way, but minus the excessive heat. In April and May the same winds prevail, but are not as strong.

The pleasantest months are May, June, July and August, which may be termed the winter months. If it begins to be chilly in May, the two last months are usually mild and warm, but if the cold sets in during July, this month and August are the coldest. The thermometer sinks then at night to a few degrees below 30 deg. F., as low as 20 deg. F. occurs rarely. The thin ice formed at night begins to melt soon after sunrise, but remains frequently till noon in shady places. The south-east wind is often raw and disagreeable at this period, even by day. Snow is not known to have occurred here, but hoar-frost is sometimes observed in calm weather. Excessive perspiration day and night during the long-continued heat renders the body weak and sensitive, so that the cool or cold weather is felt very severely. Catarrh prevails at this season, although it is the time for recoup-

ing the exhausted system enervated by heat. The natives also divide the time into four seasons, not according to months, but simply as regards the temperature prevailing. The cold period they call *lurba* and *lurbaka*; the next following *mballagata*; the hottest season is termed *mballaka* and *albolbuka*, and the succeeding one *lurbagata*. Rain is the rarest phenomenon, not pertaining to any particular season. The usual signs are illusionary, or frequently it seems as if a downpour was about to take place, but a few drops may only fall, most of the turmoil consisting of wind and dust accompanied with flaming flashes of lightning and crashing thunder-claps. During the 14 years of our residence here, soaking rain, causing the water to flow, and also droughts have occurred in each season, but the summer months are mostly the wet months. There have been also summers without any, not counting passing showers, which are of little use in this country; they neither add to the water supply, nor produce feed, simply cooling the air for a few days. Rains from the south lower the temperature, being followed by cool south-east winds for some time. These, in winter, are certainly often disagreeable. Only the heavy showers during the warm and hottest seasons produce any growth of grass, especially, if followed by lesser showers at comparatively short intervals. Without these latter, the growth of grass remains poor and scanty, and occurrs only in protected localities. Should the rains fall during the months of April, May, June and July, as, for example, in the year 1889, nothing will grow after them, however copious they may have been. Rain scarcely ever occurs but as showers during thunderstorms.

The duration of the flow of the water in the river-beds depends upon the magnitude and duration, and quick succession of the floods; a single flooding soon passes off, notably in the middle of summer, whilst another soon following, the flow is more continuous, especially in winter. The longer the drought lasts, the salter and more bitter becomes the water in the waterholes of the River Finke. While the water of our wells remained fairly good for many years, it became quite bitter and undrinkable after the winter-floods in 1889. It was also useless for watering the gardens, so that few plants remained alive, and even moderately large almond-trees succumbed.

Whirlwinds are common. At the change of the wind many, and some even of colossal magnitude, may be seen rising high-aloft, whirling upwards all loose grass and brush together that is encountered in their path. On the other hand, mirage is a rare phenomenon, visible only at a few localities, and not nearly as marked as further south upon the large saltbush plains about Farina, Hergott, &c.

3. Natural Products.

a. MINERALS.

How rich or poor in minerals this region may be the near future will show. For several years past they have been eagerly searched for, especially in the MacDonnell Ranges, and thousands of pounds have been spent in this pursuit. The Krichauff Range does not appear to contain anything but red sandstone and iron-ore. In the eastern part of the MacDonnell Ranges there are already a large number of gold-diggers, and some fine nuggets are said to have been picked up. A few years ago there was much excitement about the discovery of rubies, but they proved to be garnets. At present the mica of this region engages the attention of prospectors on account of the large size of the plates procurable.

b. PLANTS.

In consequence of the scanty rainfall and the ever-recurring continued droughts the vegetation is meagre, but after copious rains the display of flowers of the herbs and shrubs is magnificent. It is only a pity that it occurs so seldom. There is a large variety of plants, but few of great size or luxurious aspect, and only a few trees. The most common of these latter is Red-gum (*Eucalyptus rostrata*), growing in the river-beds, where it attains all sizes up to a hundred feet high, and six feet in diameter, but giving little shade on account of the sparse foliage. Many of them are crooked or hollow, but some are straight and sound. Their timber is more or less durable, according to age and position. A less common tree is the Beefwood (*Grevillea striata*), which occurs either singly or in small groups. It may attain a size of fifty or sixty feet in height and two feet in diameter. The bark is rough, with immense cracks, mostly black; the leaves are a quarter of an inch broad by a foot long; the wood resembles beef in aspect, hence its name—*beefwood*. The majority are sound and healthy. The Desert Oak (*Casuarina Decaisneana*) has mostly a slender, straight stem about twenty feet high and one and a half feet in diameter; the bark is rough and cracked; the branches, with their cord-like twigs some ten inches long, form generally a pretty round top, but do not afford much shade. The main or tap-root appears to descend as deep into the ground as the tree ascends above it—at least, this is the case with the small trees. It grows either singly or in groups, and forms occasionally forests on the sandhills in a few localities. The wood is white outside and brown within; it splits easily, and while fresh is easily worked, but when dry becomes very hard. In water it lasts better than *Eucalyptus rostrata*. With it all the wells have been timbered, and it was found very suitable for

beams. The Pine (*Callitris verrucosa*) grows here and there in the ranges, and remains low and small, on which account it is unsuitable for timber. The Fan-palm (*Livistonia Mariæ*) only occurs in the Krichauff Range, and at one locality some eight to ten square miles in extent, where it grows in the beds of the Finke River and some smaller water-courses coming from the north-west. It overtops all other trees. The wood is stringy, like straws compacted lengthwise, and is very light when dry. The fruits are of the size and form of bullets, and as hard as stone. Most of the interior consists of endocarp, covered with a thin skin. They form an immense grape-like cluster, which springs from between the leaf-stalks, and hangs down like a mistletoe. The leaves consist of a flat stalk ten to twelve feet long and some two inches wide, with short spines on both sides, and bearing at its extremity a fan of leaflets some five to six feet long. The Grass-tree (*Xanthorrhœa*) grows at a few places on the sandhills, its trunk attaining a height of about six feet and a diameter of one foot. The cord-like but quadrangular leaves of about three feet in length grow from the summit and hang down like long hair, a cylindrical fruiting-scape rising from their midst to about seven feet and about one inch thick. The bristly head of leaves, with the solitary black scape rising above it, give to these trees a weird, fairy-like aspect in the midst of fields of the forbidding Porcupine-grass, especially when seen for the first time at night. All other ligneous plants growing on the sandhills, plains, water-courses, or in the ranges form only low or moderately-tall shrubs, with the exception of the Mulga (*Acacia aneura*), which attains to the size of small trees. At some places the thickets formed by the shrubs are so dense that they can scarcely be penetrated. Formerly bush-fires occurred frequently, but since the introduced stock has fed off the grass they have become less prevalent. Of fruit-bearing trees and shrubs there are none according to European ideas or taste, but many from the native point of view. All these fruits have either too much of the stone and scarcely any fleshy part, or else possess a too-acrid or acidulous taste. Of cultivated plants, figs grow fairly well; all others will not flourish. The Date-palms also grow very well, but how they will fruit time alone will tell. Various culinary vegetables thrive indifferently, but cauliflower excellently. The reason for the ill-success of the gardening efforts is to be sought for more in the bad water of the Finke River than in the climate. After rain many plants grow well, even during the hot season.

c. ANIMALS.

All domestic animals, such as horses, cattle, sheep, goats, pigs, dogs, fowls, &c., have been introduced by Europeans, and do very

through want of feed. The dryness, and consequent poverty of the country, is also evidenced by the indigenous fauna. There are no large representations of it besides Kangaroos and Emus. Of marsupials, the largest is the Kangaroo, called *Arira* by the natives; the second in size is the Uro, with the native name *Aringa;* the third is the Rock Wallaby, or *Aroa* of the aborigines. Besides these there are others known by the following native names:—*Inmora*, *Kwalba*, *Iwuta*, *Kweba*, *Tnunka*, *Putaia*, *Mota*, *Antina* (the common Opossum), *Tjilba*, *Gurra* (probably the Long-nosed Pouched Badger, *Parameles nasuta*), *Tatja*, *Ruartja*, *Tokia* (certainly the Garden Dormouse, *Myoxus nitella*), *Lukura*, *Inalinga* (the Ant-eater). There is besides the marsupials the Native Jackal, commonly called "Wild Dog," but by the natives *Knulja;* and a kind of cat, termed *Lukaringa* by them.

Of reptiles, the Lizards and Snakes are represented in fairly large numbers. The natives have names for at least nine different kinds of lizards, of which the largest, *Tjunba*, is about eight feet long, and 22 inches wide from one foot to the other. The others are called *Loatjira*, *Ntjira*, *Baliaka*, *Irbanta*, *Takinjara*, *Rena*, *Ngenäurbarana*, *Ntarita*. Snakes, called *Apma* by the natives, exist here in great numbers, of various colors, and of considerable sizes, up to the thickness of an arm and a length of eight or nine feet. The natives have names for 22 kinds, viz., *Laltacalbula*, *Ilumpalatnina*, *Lanjararintunana*, *Njuritja*, *Kapiltaringa*, *Menkaltarina*, *Latuara*, *Renina*, *Ulpopana*, *Warankula*, *Ilparalea*, *Lalpalanana*, *Erulangalanana*, *Baraloatjira*, *Gulaia*, *Gnaringa*, *Rata*, *Ilbaraba*, *Rumburunga*, *Putamanina*, *Erakurkargina*, *Ntadirka*. Most of these are venomous.

The voice of frogs is heard very rarely, still more rarely are they to be seen. They live in the sand, and only appear above ground after rain, and then exclusively at night. Their voice resembles more the bleating of a sheep than the croaking of European frogs, and many new-comers are deceived by it.

The fishes are called *Irbunga* by the natives, who name nine different kinds, viz., *Antabikua* (as large as a herring), *Longulbara*, *Ntamantana*, *Arumunta*, *Babababa*, *Renginga*, *Ltemba*, *Raltaralta*, *Kwalbila*, and *Ltjauma*, the last being really crayfish, but which they do not eat.

Birds of great variety, of all sizes and colors, are to be met with here, especially after continued rain and subsequent floods. The largest bird is the Emu, called *Ilia* by the natives. There are also some wild Turkeys, which the natives call *Itoa*, and a few Pheasants, for which the native name is *Ngamara*. While the Emus and Turkeys lay their eggs upon the ground, the

Pheasants place theirs deep in the sand, for which purpose a hole is scratched out and two eggs deposited, and covered over; a little distance away it does the same, and so forth until finished, the sun effecting the hatching. The young ones appear in pairs above ground, and at once commence to search for their food. The Emu hen gets her eggs also hatched by the sun, but she takes a good deal of care of them, and when hatched takes the young under her protection, and they follow her about. The Turkey acts in the same manner, but appears only to lay one egg; the young one she takes about with her by carrying it upon her back. The food of the Turkey is gum secreted by various trees and shrubs, and caterpillars of the nest-building kinds; the Pheasants eat snakes, &c. Pigeons of various sizes occur almost everywhere; and the red-legged Water-Hen is also found here and there, besides Ducks, Pelicans, Spoonbill-Geese, Snipes, &c. Black and white Cockatoos are not wanting either, and fill the air with their discordant cries. Most plentiful of all are, perhaps, the various parrot and sparrow-like birds. For all of these the natives have names, amounting to about 43 kinds in all, among which are several Hawks. Nor must we forget the Crow, which can endure frost and heat. There are also a considerable number of night-birds, such as Owls.

Caterpillars of various kinds sometimes infest the country, especially after rain. A peculiar kind, called *Weba*, is a favorite article of diet with the natives. There are also various species of beetles and other insects. One species is a favorite food of the natives, who call it *Alknenera*. Wherever *Eucalyptus rostrata* occurs, the latter (a species of cicada) come out of the ground, have leathery wings, and are larger than cockchafers. The males have a sort of drum on each side, connected by a channel across the underside, the whole being covered by a valve, through the opening of which they produce a continuous, shrilly vibrating noise.

The flies here are very bold and importunate, like angry bees, and can scarcely be kept off, especially attacking the eyes.

The mosquitoes are also sometimes a great nuisance; and spiders, centipedes, scorpions, ants, &c., abound, but their venom does not appear to act fatally, although causing great pain.

II. THE ABORIGINES.

1. Physique and Diseases.

There is probably scarcely a country where the aborigines are so few in number as in Central Australia. Sometimes one may travel for days without meeting a single one. During our resi-

dence here they have become considerably reduced in number. The causes are various, as for example, the incessant murders for the sake of revenge, few births, and being shot down. Of the last, several cases came to our knowledge in years gone by, and we have also been told by white people, and especially by the natives themselves. Latterly nothing of the kind has occurred.

Their hair is not woolly, like that of Negroes, but straight; in a few cases the ends are slightly curled; it is dark-colored, and but rarely fair. In a state of nature it hangs down uncombed and confusedly, hence their repulsive appearance. Usually they tie it up into a top-knot with string made of the hair of rats, so that it forms a sort of a short thick queue. Being anointed with grease, covered with dust, and unkempt, their hair gets matted into ball-like masses. A few have fine beards and whiskers, but the latter is generally the best developed. As though under some solemn vow, they will allow no razor to touch their beards. The moustache is cut, but formerly, whilst this was being done, they held fast their hair and beard with both hands. The mouth is wide, the jaws somewhat prominent, but not the chin; the lips are certainly thick, but not nearly so protruding as those of the Negroes; the forehead rather recedes backwards; the upper part of the nose is depressed, causing the lower forehead to project, whilst the tip is broad and thick, and the round nostrils are widely separated. The cheek-bones are prominent, and the eyes are sunken, the white parts being dull and of a bluish tinge. The body on the whole is slender and well built, although there are a few who are stout and broad.

Blind and half-blind persons are numerous, caused by eye-diseases, which prevail at the change of the season after the great heat. The halt, and the deaf and the dumb, are also to be found. A kind of climatic fever prevails usually at the end of the summer, which prostrates one after another. The scars on the faces of some afford evidence that smallpox affected them some 16 or 18 years ago. They call the disease "*Pania.*" Some are said to have died of it. Little children are often subject to diseases of the throat, which prove occasionally fatal. The worst disease among the natives is syphilis, with which everyone is more or less tainted. From the first we have had to treat this disease, and several of the natives have died of it. The disease appears to be becoming more prevalent, due probably to general prostitution. Owing to this disease few children are either born or are then so delicate, that when grown up they have not the stamina of the white inhabitants, though the latter are exotics to the climate. There is certainly no great future for this people.

2. Mental Capacity.

The mental capacity of these aborigines is not in any way equal to their physical development. Indolence and laziness are their greatest faults, and the cause of many others. This is due partly to the poverty of their country, which, by causing tillage of the soil to be an impossibility, forces the natives to depend upon the wild and precarious life of the chase. Rightly a German proverb says, "Fishing and bird-catching spoil many a fine youth." Such hunting and rambling about in the bush kills all mental activity, and lowers man to the level of the beasts. These aborigines have mental capacities, but they are lying dormant. It is only necessary to develop these, and to show them the use and advantage of so doing, but, unfortunately, there is nothing on which they can exercise their talents. What advantage can it be for a youth to learn if he has no prospect of obtaining a position corresponding to his attainments? No, he must remain as he was! Must not this produce indifference? One finds, therefore, their talents weakly developed because unused throughout their life. To reflection they are quite unaccustomed. To train them to reflect, or to habituate them to think, requires a great deal of trouble. This we have especially experienced in our linguistic labors and in the literary work now in hand. The concrete is comparatively easy to them, but as soon as the abstract is touched upon it is impossible to keep their attention even with the greatest patience and effort, for they deviate in all directions. Asked for the reasons of their social and religious customs, their final reply is "*Wara*"—*i.e.*, "Our habit; nothing else." To such habit their whole rites have been degraded, so that they themselves do not know rightly why they do it, and are incapable of explaining. This is also the reason of the difficulty of discovering their motives, and caused the investigation of their social regulation in respect of their Eight-class system to be so troublesome. Information can only be obtained by accumulating many examples from their actual life, and then directing their attention to them. For such mental work they have no inclination, and would much rather do some hard bodily work. They take the greatest pleasure in riding horses. It is rather difficult for them to comprehend arithmetic, yet we have advanced several scholars so far that they can do the four rules of arithmetic without error, an indication that they are capable of some mental culture.

In their own language they can count to four only, viz., One, *ninta;* two, *tera;* three, *tera ma ninta;* four, *tera ma tera.* After these they have *urbutja*, some; *njara* and *knira*, many; and finally, *kniranjara* or *hyaraknira*, very many. The number of their own fingers they cannot count accurately, and they have quite a different idea of numbers and things to ourselves. If

they have seen 10 emus, for example, or 15 or 20 strangers approaching, they say in either case "*njara knira bitjiririma*," "very many are coming." This is quite natural under the circumstances. Many contradictory elements are found in their religious views and habits. It never occurs to them to reflect about this. If their attention is directed to them, they smile complacently, and continue to adhere tenaciously to that which is customary. In their domestic affairs their want of reflection is also exhibited. The saying "Take not thought for the morrow, &c.," is unnecessary advice to give them. At times grain is plentiful, but to store any for the future never enters their minds, or that a bad season will follow a good one. Similarly the idea of a life after death gives them no trouble, owing to the abeyance of their reflective faculties. Many a time we have warned them not to kill cattle, and yet they could not resist the temptation, ignoring the consequences. Many a time have we also warned them against the murders for revenge, and showed them that ultimately they must fall themselves as victims, but with a similar result. The word of God alone can produce a change here, as we have with some, who placed themselves under its rule; no external culture can do it. Therefore more mission-stations should be founded, and the native induced to reside there; that alone can save them bodily and spiritually. Hours, even days, they can sit stolidly in the shade of a tree, or lie there, without getting tired, humming at times to themselves. To explain spiritual matters to them is not easy, especially as there are not words to express the ideas, and will have to be coined for the purpose. To learn the meaning of these they find exceedingly difficult, and only a few can master it with effort. Their memory is good, and exceeds that of many white people. They are quick at learning by rote, and retain anything they have heard, learnt, or experienced. For music and singing they have a good ear, and they easily pick up a tune. Some have also good voices, and use them, but others are too lazy to exert themselves to sing. Their aboriginal songs are very monotonous and monosyllabic. To learn and sing them requires neither trouble nor application. Perhaps this explains their liking for extending their singing performances till late into the night; even children thus sing at their games. Usually they beat time to it with their hands, or slapping their bare legs, or with their *tnuma* (short stick) upon a trough. The tone moves from quinte to quinte monotonously. If, for example, they have repeated the stanza several times in the high *d*, they sing it again several times in *g*, after this in low *c*, and then begin again at the high note, and so *ad libitum*. The whole stanza consists of three to five words, which are endlessly repeated until they change it for another to the same tune. The burden of

these stanzas or verses is either a prayer to save them from some disease, as "*Antaba tarta potinga!*" *i.e.*, "Headache quiet become!" or, "*Aralba pananaia!*" *i.e.*, "Dry up smallpox!" or a prayer for "*tjurunga*," or food substance, or some such object. Popular songs they have none, for the simple reason that they are deficient in popular sentiment; nor heroic songs, because there are no heroes among them. Their perception is, like that of all children of nature, of no mean order. To describe an object according to its external form, color, and properties is easy for them, and they can mimic speech, actions, and other peculiarity. Their *tjurunga*, corroborees, are mostly animal-*tjurunga* (feasts?); thus at an Emu-*tjurunga* they imitate exactly an Emu in all its movements. The paintings of their bodies also represent mostly animals, such as snakes, frogs, &c. Although only able to count up to four, they can individualise large herds of cattle or horses, and can tell at once if one is missing, and which, and what its color or appearance may be. In tracking they are great experts, perhaps equalled by few. They can tell fairly well how old the track is; and distinguish that of every man and animal from that of others. Where nothing is apparent to us they follow without hesitation. The imagination is largely developed. Not only by night do they fancy they see and hear all sorts of things and sounds, but even by day—the offspring of fear. Thus they tell of nocturnal spies, which one or the other fancies to have seen or heard. If requested to show the tracks, they say that these walk without touching the ground. They will even name those they fancy to have perceived. It has happened several times in broad daylight that they have come to report that yonder were *tnenka*—*i.e.*, enemies! These proved to be either animals or only bushes. They can make fanciful comparisons, as, for example, the names given to several heavenly constellations. The Southern Cross they call "*Eritjinku*"—*i.e.*, eagle or hawk's claw. The Milky Way they term "*Ulbaia*"—*i.e.*, water-course. The sun is for them a woman with a great firestick; when she puts on much wood the fire blazes up tremendously, and begets the excessive summer heat. In the evening the sun-woman passes under the arm of an old woman, and becomes invisible. Her nourishment consists of grubs feeding in timber. The moon is an unsexed male, and called "*Atua*." As the new moon, or young man, they view it rejoicingly, and call each other's attention to its appearance. He feeds on opossums, which causes him to get so round and full. Then he gets old, becomes attenuated, and disappears in the ground. The stars are distant fires.

3. Character.

The natives are deficient in courage, and commit their revenge —murders only—by stratagem, waiting and spying till they can

surprise their enemy alone at night. They are afraid to engage in open combat, or if they do, they must feel themselves superior in strength. The most innocent sounds may be productive of fear and trembling, through their imagination. They are easily roused to great anger, when they will scold and abuse each other for days, or even beat and wound with spears, but the latter only by piercing into the thick muscles of the thighs. To prevent such a quarrel ending fatally, the rest interfere, when necessary, armed with their spears. At other times they will sit comfortably together and tell tales. They consider the aged, sick, and infirm members to a certain extent, and supply them with food and drink if not requiring too careful and tender treatment; but otherwise they may precipitate the end by their inconsiderate action during outbursts of sorrow and grief.

They can also take pleasure in being extremely cruel. They may beat some at times to death. Their enemies they spear in places where the wound is not speedily fatal, break off the shaft, and push the barbed end still deeper into the body; they then scorch the wound and adjacent parts with a firestick, to induce people to think the person had been killed by falling into the fire. They can also be tender and kind, carrying wounded comrades, &c., carefully in their arms or on their backs.

The natives are also hospitable. When visitors arrive in camp they give whatever they have. Everything conducive to sociability and amusement they cultivate and practice as much as they are able. They do not care to be much alone, but sit together for hours and days, chattering about nothing in particular, or lewdly, even in the presence of children, without a thought or a care. They are fond of numerous visitors, and of returning their visits.

Courtesy is not unknown among them. They salute each other by striking the thigh several times with the palm of the hand. When strangers pay a visit they do not enter the "*tmaruna*," camp, at once, but sit down at some distance and wait till someone comes and takes them in; if there be no man at home, the oldest woman performs the ceremony. If a larger number arrive in company, the whole "*tmara*," camp, becomes agitated. In solemn procession they go to meet them, with their weapons in their hands, approaching in serpentine curves, and performing all sorts of bodily motions, while the visitors stand still, the spears placed before them, the point directed upwards. After saluting each other they sit down and chat.

In regard to living, the natives are quite thoughtless, never heeding the future. If they have something to eat, they feed until it is finished. Some can devour three-fourths of a sheep at

a sitting, and drink in proportion. On the other hand, they can fast for a considerable time, and only when hunger compels will they leave the camp for a fresh supply, and if they cannot get anything else, are satisfied with the toughest roots.

They are heedless, and cannot be depended upon. If not constantly supervised something is sure to be done wrongly, left behind, lost, or wasted. If scolded they laugh, and do not understand the value of time or things; if their huts burn down they make merry over it.

The laziness of the natives is great. To get them to work is difficult; and still more to keep them at it. Directly one's back is turned they either sit or lie down, or disappear altogether. They consider it a great favor to give the smallest aid. To beg they are not ashamed, but annoyed if they do not get what they want, calling the person a miser.

Lying, cheating, envy, bearing illwill, having ambition, and being conceited, are by no means unknown emotions amongst them, but they lack generosity and nobility of mind. Their rule is, "Eye for eye," &c., and if one only employs a chiding word, or gently strikes the unmannerly child of another, it is resented at once, and paid back with interest.

The natives respect an oath or solemn promise. They have a certain idea of adorning themselves, but their tastes differ from ours. To beautify themselves they rub their bodies with grease to make the skin shine, and try to ornament it by painting, and the application of tufts and cords. Nor do they take equally to all, hence arise connubial quarrels.

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4. Social Life.

a. The Eight-Class System.

The social as well as the family life of this people is largely governed by a system of eight castes (classes), which forms the basis of all degrees of relationship among them, and they, therefore, adhere with great tenacity to it. That there should be any deviation or change in this is quite incomprehensible to them, as that would force them out of the old routine into a new and strange course, which is entirely beyond their horizon. All the eight classes are co-ordinated among each other, neither more nor less privilege appertaining to any. With respect of marriage, this is always between a prescribed pair, thus forming four pairs of classes by prescription, although eight by name. The following synopsis shows which classes may intermarry, and to what class the children of the four pairs belong:—

Males.		Females.		Children.
Beltara	...	Gomara	...	Bunanka
Pungata	...	Mbutjana	...	Knuraia
Gomara	...	Beltara	...	Purula
Mbutjana	...	Pungata	...	Ngala
Bunanka	...	Purula	...	Beltara
Knuraia	...	Ngala	...	Pungata
Purula	...	Bunanka	...	Gomara
Ngala	...	Knuraia	...	Mbutjana

The rule is that those who stand on the same line marry first, but under certain circumstances marriages in a diagonal line are permitted to take place, for example, a *Beltara* may marry a *Mbutjana*, and a *Pungata* a *Gomara*. But whether the *Beltara* has a *Gomara* or a *Mbutjana* for his wife is immaterial to the classification of the children, who are *Bunanka* according to paternal descent. The same rule applies to the other classes. That two classes have the right of intermarriage, I think may be accounted for in the following way, viz., that formerly this people had been more numerous, when class intermarriage was not allowed. But when subsequently it became much reduced in number, one class may have contained only a few men, and the other a few women, they then resorted to this relaxation of the rule to avoid extinction, and permitted intermarriage between two definite classes. At present their numbers are so reduced that, even with this, marriages can scarcely take place within the prescribed limit, especially as many white people attach to themselves native women. Polygamy makes wives still scarcer, as some men acquire two or three. A bachelor has, therefore, to wait until he is lucky enough to get a wife, *i.e.*, until some *rendera* or *gamena* gives him his daughter. The *gamena* can only do this when the aspirant is not the brother of his mother. For if his mother is not from the direct line, but the indirect one, he calls her brothers also *gamena*, and may not marry her daughters.

Among Christians the family is formed by the various degrees of consanguinity; among these natives it is constructed on the class system. The family is supported by it, or rather born out of it; for a youth has not the right to choose a bride for himself, but must take the one selected for him by some *rendera* or *gamena*, as stated above. He makes no demur at this. Such a marriage only gives rise to a few new degrees of relationship. Neither the man nor the woman assume any new title, the connubial relationship being only indicated by affixing the word *iltja* to the names, while the affinity of the class is denoted by the affix *lirra*. Thus *noa* means spouse or partner; *noa iltja*, real spouse, with whom he cohabits. Again, *kata* signifies the father of the class; *kata iltja*, sexual father. Ordinarily they leave out

the words *iltja* and *lirra*, and do not use them, because they all know among themselves who is personally related, and who is not. They are only used casually when conversing with strangers, to whom they wish to explain their family relationships. For the slightest difference in affinity the natives have distinctive names, which are also employed in the family. Thus all persons belonging to the same class (even if they, according to our ideas, have no consanguinity) call themselves *arumbinjara* and *itiinjara*, which means something like brothers and sisters. The younger one says *arumbinjara*, the elder *itiinjara*. If only two be present, the younger says *arumbananga*, "we both (are) brothers (sisters);" the elder *itiananga*, which means the same. The elder brother and sister call the younger brother and sister *itia*, while the younger brother and sister call the elder brother *kalja*, and the elder sister *kwaia;* besides this the younger brother calls the elder sister *arumba*, and the younger sister the elder *nkura*. The younger brother says, therefore, "*kananga*," (we are) two brothers, or "*kananganganga*," we (are) brothers; the elder says "*itiananga*," (we are) two brothers; or "*itiinjara*," (we are) brothers. Similarly the elder sister expresses herself in respect of the younger sister or sisters, but the younger one, on the contrary, says "*nkurananga*," or "*kwaiananga*," we two (are) sisters; or "*nkurinjara*," or "*kwaiinjara*," we (are) sisters. These examples will show how they indicate by separate names certain differences, which we cannot in our language without employing several explanatory words. Accordingly, their relationships are very complicated, so that even the cleverest among them are often unable to find the right answer. Only by instances from their own life can this be rightly inferred, and one must be, therefore, quite accurately informed before one can determine their family relationship.

In the following synopsis a *Bunanka* man and woman is taken as an example of the nomenclature of all the classes. The same terms are used by the other classes, but, of course, in their proper application, as will appear from the table:—

Bunanka-men call the

BUNANKA-men: the elder, *kalja;* the younger *itia;* the very old, *arenga* and *katatama;* and these the same, *arenga* and *katatama.*

Women: the elder, *kwaia* and *arumba;* the younger, *itia;* the very old, *lora* and *lorebmana;* and these the same, *ebmana* and *arenga.*

KNURAIA-men: the elder, *ebmana* and *kaljebmana;* the younger, *ebmana;* the very old, *arenga* and *katatama.*

Women: the elder, *kwaiebmana;* the younger, *ebmana;*

the very old, *ebmana* and *lorebmana*; these the same, *ebmana*.

PURULA-men: each other, *mbana*; when father's sisters' children, *i.e.*, if their father be a *gomara*—each other, *ankalla*, *kalja* or *itia*; when a *Mbutjana*—*tjimia*; the very old call each other *katatama*.

Women: each other, *noa*; the very old, *lora* and *lora-balla*; these the very young, *katatama*.

NGALA-men: each other, *mbana*; when children of the father's sister, and he a *gomara*—*ankalla*; if a *Mbutjana*—*tjimia*; the very old, *katatama*, and these the young by the same name.

Women: each other, *noa*.

GOMARA men: *gamena*; and he the others, *amba*; also the father-in-law, *gamena*; the son-in-law, *kniritjaknatja*.

Women: *maia*, these the other, *katja*, *amba*; the son's wife and sisters—*nomara*.

MBUTJANA-men: *rendera*; these the others, *gamena*; also the father-in-law and his brothers, *rendera*; the son-in-law and his brothers, *amba*.

Women: *kwaimba*; these the other, *gamena*.

BELTARA-men: *kata*, *kniritja*; these the other, *katjia*, *lirra*.

Women: *wunjinga*; these the other, *katjia*, *lirra*; the mother and sister of the wife, *mahra*.

PUNGATA-men: *kata*, *kniritja*; these the other, *katjia*, *lirra*.

Women: *wunjinga*; these the other, *lirra*, *katjia*.

Bunanka-women call the

BUNANKA-women: the elder, *kwaia*; the younger, *itia*.

Men: the elder, *kalja*; the younger, *itia*; very old ones, *katatama*; these them in return, *arenga*.

KNURAIA-women: the elder, *kwaia*; the younger, *itia*.

Men: the elder, *ebmana*; these them also, *ebmana* (therefore mutually).

PURULA-women: *kwaitjala*, and these them similarly; the very old, *lora* (mutually).

Men: *noa*, and these similarly in return; the children of the father's sister in direct line, *ankalla*, in indirect one, *tjimia* (also when the father of the mother).

NGALA-women: *kwaitjala*, these similarly in return.

Men: *noa*; these similarly in return.

GOMARA-women: *maia*, these the others, *amba*.

Men: *gamena*, these the others, *amba*; if the husband's father and brothers, or the brothers of the mother—*mbatjinga* and *kaljimba*; these them in return, *nomara*.

MBUTJANA-women : *maia;* these them, *amba.*
Men : *gamena;* these them, *amba.*
BELTARA-women: *wunjinga;* these them, *lirra, katjia;* the mother and sisters of the husband, *kwaianirra;* these the wife and sister of the son, *lirranirra.*
Men : *kata;* these them, *lirra* or *katjia;* the husband and brothers of the daughter, *wuiamahra.*
PUNGATA-women : *wunjinga;* these them, *lirra, katjia.*
Men : *kata;* these them, *lirra, katjia.*

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6. TRIBAL MARKS OR TOKENS.

The classes possess no class-marks, but the tribes living southerly and westerly from here, called *loritja*, have one in common with ours distinguishing them from those dwelling north and east, who are called *ulpma*. The mark of the latter consists of emu feathers worn on the forehead and upper part of the arm, while that of the former is made of small sticks scraped into little bunches of shavings, which they wear upon the head.

c. ARTS.

The arts of this people are not of much account. Still, it is astonishing how they can have produced some of their utensils with their rude tools, such as stone axes and knives. These consist of a kind of sharp flint, which is found south of the Krichauff Range, and which these natives barter for other things. To make an axe they take a piece of wood with a fork at one end, into which they fix the stone with resin. The latter they prepare by crushing it moderately fine between stones, sprinkling some water upon it, holding it over the fire until it melts, and then kneading it well together. The stone-knife is fixed to the handle of their *tmera*, and is more like a chisel than a knife. The *tmera* is a trough-shaped piece of wood hollowed out thinly, and about two feet long, somewhat bent together at both sides, straight and open at both ends. One end has a barb for throwing spears; the other forms a flat handle with the stone-knife fastened to it. They fix the spear to the barb, grip the handle of the *tmera* and the spear with the same hand, throwing the latter only. The spears (*tjata*) are made of various kinds of wood suitable for the purpose, such as *Tecoma australis*, *Acacia aneura*, &c., and thinner at the hinder than at the anterior extremity, being respectively about the thickness of a thumb and of a little finger. The length varies from six feet to ten feet, according to the intended use. For fishing short oncs are used, without barbs, and made out of one piece; others have an extra piece, six to eight inches long at the point, made of hard wood (*Acacia*

Kempeana) as a headpiece, which is fixed with the sinews of marsupial rats to the shaft. Fastened to this is a small barb, a few inches distant from the end, which terminates flatly instead of cylindrically. If the shaft becomes too short, it is lengthened by another piece firmly fastened on with sinews. They are generally called by the name of the wood employed in their manufacture. For defence they have a shield, *ulkuta*, two to three feet long, and one foot wide, made of the wood of *Erythrina vespertilio*, of trough-like shape, and with a handle on the inner face. Various sized domestic utensils for food and water consist of hollowed wooden basins, made of different kinds of timber, which are used also as substitutes for cradles, &c. Wherever a mother goes she takes her baby with her, carrying it in one of the troughs under her arm and resting it on her hip.

A thick stick, five to seven feet long, serves as support to the old people, and is used by the women to dig out roots, worms, or rats. Frequently this stick is also used for chastising purposes even to the effusion of blood or stunning the culprit. The men have a shorter stick about two feet long, but do not employ it as frequently as the women, because they are obliged to go out hunting, and when quarrels arise they use their spears. From the skins of marsupials bags are made, but rags are beginning to be used instead. If they happen to pick up a piece of iron, they make a handle with rags and sharpen one end upon sandstone. For filling cracks in their basins, and for fixing the stones in their weapons, resin from a certain species of porcupine-grass is used.* They bruise this grass until the resin becomes fluid, and then knead it into a single lump. When they wish to plug up a crack, they soften the mass with heat, and then press it into the fissure. It resembles black sealing-wax, but is not quite as brittle. They call it *nurbma*. Of the hair of various kinds of marsupials they spin cords for ornamental purposes, and amulets, and charms. For the latter purpose they also use the hair of the dead. For spinning they bark a small stick, eight to ten inches long, form a slit, and put a short crosspiece through, so as to form a kind of cross. At the lower end it is pointed. When used it is placed upon the thigh, and with the hair rolled rapidly towards the knee, twisting the hairs together as it revolves. When the yarn has attained a length of two to three feet, it is wound up around the crosspiece. When quite full, the yarn is removed, being wound into two balls. It is converted into thread in the same manner, only that the motion is reversed.

The natives have also some knowledge of the use of drugs. They employ teas made of the leaves and bark of some shrubs

* Probably *Triodia Mitchelli*, or *T. pungens*, both of which have viscid leaf-sheaths [ED.]

and the whole plant of others, which they drink. Thus they sue *Callitris verrucosa*, *Acacia sentis*, *A. strophiolata*, *Stemodia*, *Cynanchum floribundum*, &c.

d. DRESS.

These aborigines are absolutely nude. They practise a certain decorum, which decrees that the two sexes keep 10 to 15 paces apart when they meet, and if necessity compels a closer approach they keep their backs towards one another, or the women step quickly aside. But during quarrels, or in the event of sickness or death, all modesty is thrown aside, and they mix indiscriminately together. In winter they remain between the fires until the sun shines warmly. If they have to go away, they take a fire-stick with them for warmth or to rekindle another if necessary. If they have none they make fire by means of two sticks, which they rub together, holding finely-scraped shavings to the rubbed place. Usually they employ their shield, which is of soft wood, for this purpose, together with the *tmera*, which is of harder wood.

European clothing they like very well. If they can get hold of any old rag they put it on, even if it be only a stocking, boot, hat, or waistcoat, often presenting a ludicrous appearance. Such an article of clothing will circulate among them, one wearing it to-day, another to-morrow. But they have no idea of taking care of clothing, which speedily becomes destroyed.

e. ORNAMENTS.

In ornamenting their bodies the natives devote much time and care, especially the men, which includes anointing it with fat to make it shine. Tattooing is also practised, which they call *urbmalilama;* it is performed on the chest and upper arm, and consists of longitudinal and transverse lines. Usually the son adopts the pattern of his father, but sometimes chooses one according to his own taste. Both sexes tattoo themselves. It is done during childhood, either by themselves or by others for them. Some of the natives have a great number of scars on the chest and arm, produced by scratching the skin lightly with their *irgalla*, or stone knife, or else with a small piece of wood, *ntjala*, or with the shinbone of a kangaroo, about six inches long, and pointed at one end, and then applying powdered charcoal to the wounds, which causes thick rounded scars. Their hair is intertwined with string dyed white with clay, and ornamented with a tuft of white feathers, called *ndualja*. Sometimes they wear three tufts of rats' tails, viz., one in front of the forehead, and one on each side; these they call *albeta*. Through the septum of the nose they bore a hole, quite near the point, through which the *lalkara* is worn. This ornament is made of the wingbone of

a vulture (?) or the Spoonbill Goose, being pointed at one end, blunt at the other, and about six inches long. Besides the above they wear tufts of white feathers attached to the upper arm. The principal adornment, however, consists in the *ulbelalama*, *i.e.*, the painting of the body with yellow, red, and white clay, ochre, &c., into various patterns. They have, however, certain rules and a certain order for this, to which they adhere. The usual decoration consists—besides the ornaments mentioned above—of a semicircular red or white streak above the nose and on the cheeks, the convexity upwards; red or white dots on the forehead; and several elongated curved red streaks on the chest and abdomen, which gradually lengthen, so that one ring-segment overlaps and encloses the other.

A messenger, however, wears red strings in his hair; four tufts formed of finely-split and scraped sticks some five to seven inches long, fixed upon the head, and called *lilinba;* a thick black dot or broad streak painted on the forehead; and a semi-circular one of red paint over the nose. Besides the concentric oval red streaks on the chest and abdomen mentioned above, two red and black ones of semicircular form, and turned upwards, are placed above the former. On both sides elongated red streaks are made, which look like bundles of sticks. Upon the back the messenger has a sort of red disk, formed of concentric rings, with four half-round disks, also consisting of concentric curves. Other figures are painted for their *tjurunga*, corroborees, of which more will be said hereafter.

f. HABITATIONS.

The natives do not expend much labor upon their dwellings. In half an hour they can erect a shelter. They gather bushes or branches, which they stick into the ground in a circle of five to seven feet in diameter, the largest first, with the tops touching; the gaps are then filled up with smaller branches, and the dwelling is finished, an entrance being left on one side. If rain threatens, grass or anything they can get hold of is heaped upon the "wurley," making it look like a rubbish-heap. Inside the ground is loosened, and the earth pushed against the walls, so that the floor resembles a shallow bowl. The locality for a settlement is usually decided by the elders. They are not at all particular, building in river-beds, on elevations, &c., the principal consideration being the proximity of water, and that the soil be not too hard. Each one erects his hut wherever it suits him. This work is chiefly done by the women. Separate places are assigned for the unmarried men and for the single females respectively, the latter being called *lukara*, and the former *nkanja*. If a married couple cannot agree, one or the other of the couple withdraws to one of them. Sometimes it happens that the hus-

band goes to the *lukara* with a stick, and fetches his wife back again, which rarely passes off without much turmoil. The pregnant women also live in the *lukara*, and build themselves one or more huts, from which the young men usually keep away. By day the young natives sit in the shade (*bunja*) of a tree, and by night sleep in the open-air; if it rains, they see where they can get a lodging. A village is called *tmara*, a single hut *lunga*—*i.e.*, shade, the only purpose it is intended for. Wherever the shadow falls, there they sit or lie, in the morning on the western, in the evening on the eastern side, at mid-day inside, or under a tree, the fire being close by. At night all sleep outside, even during the cold winter, arranging themselves between the fires. It is only during rainy weather that they go inside their huts. When a member of the family dies, the hut is burnt down, and the whole village shifted to some distant place. A council-hut is not built. If the men desire to discuss anything, they sit aside in the shade of a tree, or under the open sky.

g. FOOD.

Although the country is but poor, the natives have a number of articles of food, many of them not of a choice or very digestible nature. They divide these nominally into four classes, viz., (1) *garra*, meat; (2) *ntjaba*, worms and beetles; (3) *mana*, plants, vegetables; (4) *unkuala*, sweets.

1. *Garra.* Their meat consists of marsupials, *tanatana*; birds, *deba*; fishes, *irbunga*; lizards, *loatjira*; snakes, *apma*.

The natives hunt all kinds of marsupials with the greatest zest, from the largest kangaroo down to the smallest mouse-like animal, or dig them out of the ground. The larger the animal the better pleased they are, but they refuse none. The hunting of these is the privilege of the men, accompanied by the bigger boys. They leave in the morning, taking with them their spears, *tmera*, and sticks, usually going in pairs, or several together. They like windy or stormy weather best. On such occasions they hasten away, for the game is confused, and remains crouching, or hiding the head in a bush. The hunters advance against the wind, or sideways to it, in order that they may be neither heard nor scented, and in this way they usually secure abundant booty. They often light extensive fires to confuse the animals, and make it easy for them to spear them. They employ all sorts of decoys. Espying some game at a distance, one of them endeavors to attract its attention by various movements, while the other approaches unseen from behind to spear it. They also go out hunting in bright moonlight. The women are allowed to dig out the animals which burrow.

Lizards or snakes are captured by means of spears, sticks, or

stones, both by the men and the women. All the large or moderately-sized lizards and non-venomous snakes are esteemed as tit-bits. Their success in capturing birds is but slight; turkeys and pheasants but rarely, and emus only at their drinking places. For this purpose a hiding place of bushes is constructed quite near to the water, whence they spear them. They also put bushes of *Duboisia Hopwoodi* into the water, which intoxicates the birds, making them easy to spear. But other animals become poisoned, only escaping to die subsequently, so it is said. Young birds, especially parrots, when these are almost fledged, fall an easy prey to them. Sometimes they capture whole basins full of young birds. The eggs, especially those of emus, turkeys, and pheasants, are much prized.

Fish of large size are speared by men and boys, and eaten. When the water in the holes shrinks, they construct a barrier of bushes at one end across the water, and which is thus pushed slowly towards the other end, thus driving the fishes forward into shallows, or causing them to become entangled in the branches, when they are easily caught. This work is done by men as well as women. Crayfish are not eaten.

All the above animals are roasted in hot ashes and eaten, even to the entrails, the coarser contents only being shaken out.

2. *Njaba.* In this class of food are included insects, caterpillars, and all kinds of wood-grubs. In summer a kind of insect (Cicada sp.) comes out of the ground wherever *Eucalyptus rostrata* occurs. This the natives call *alknenera.* The males produce an incessant strident noise by means of two chambers, one on each side, united by a transverse channel across the underside. A somewhat smaller kind occurs where *Acacia aneura* grows. Of these insects the natives collect whole basinfuls, roast, and eat them. A peculiar kind of caterpillar (*weba*) appears usually in immense numbers after rain in summer. These they eat also with relish when roasted. Most of the woody plants, especially in the roots, contain grubs, the largest being about as long and as thick as a finger. Whilst all these are considered delicacies, they will not eat locusts.

3. *Mana*, vegetable food. This food the women are obliged to provide. Several kinds of yams (*woritja*) grow here, one attaining to the size of a man's head or more, but all very fibrous. Under the term *angna* the natives include the various larger and smaller fruits of capers, cucumbers, convolvuli, nightshades, mistletoes, and those of some shrubs whose berries resemble bilberries. The taste of the latter is not unpleasant, but the interior is almost all stone, as with the fruits of *Santalum acuminatum.* All the other fruits have a harsh, sharp taste, and consist almost entirely of seeds. They are eaten either raw or

roasted. The natives also collect the ripe seeds of various species of Acacia, first roast, and then grind them with water upon stones to a kind of paste, which they at once eat. Of these seeds they might at times collect large quantities and store them, the bushes bearing most profusely, but it never occurs to them to do this. *Ntanga* are seeds of various grasses and herbs which are collected by them in their trough-like basins, then ground down with water into a paste, and poured into hot ashes and baked. This is their *egalla—i.e.*, bread. Unfortunately, they have it only rarely, and but little at a time. A few kinds of herbs, inclusive of wild cress, they pick and stew green in the following way:—First, they light a large fire on the sand, remove this, and scrape the hot sand aside, so that a shallow depression is formed. Into this they place flat stones, spread the moistened cress upon them, and cover it over with other flat stones. The heated sand is heaped over the lot. After a while this is carefully swept aside, and the cress or other herb is found to be nicely stewed; it tastes best of all their *mana*. When nothing else is to be had, the roots of various grasses and shrubs are collected, as, for example, those of the common reeds, &c. These are roasted and pounded with stones to soften them somewhat and make them less fibrous. They are swallowed in pieces, for chewing has no effect, as they remain wood-like. A real "bread of misery." The young roots of the reed are the best, but they do not long remain fresh. Sometimes after rain pea-like bulbs are found in large numbers, which have a nice, nut-like taste. These bulbs are partly eaten raw, and partly roasted.

4. *Unkuala*, sweetmeats. These comprise honey, the nectar of flowers, and the exudations of several trees and shrubs (resin, gum), and even one species of ant. There are two kinds of bees here, viz., a dark-colored one, which builds in hollow trees, and a light-colored, greenish species, that nests in the ground. The former sting a little, the latter not at all. The getting of the honey is a privilege of the men. With their stone axes (now they use tomahawks) they cut a hole down to the honey. While eating the honey, a few wings, legs, or even entire bees may be swallowed in their greedy haste. After rains in spring the blossoms of some plants are so full of nectar that it drops out, especially from those of *Grevillea juncifolia*. The natives collect such flowers in their basins, pour water upon them, knead well, and then drink the water, or else they put a handful of flowers in the mouth and suck the nectar, wholly indifferent to the vermin infesting them. The exudations of shrubs and trees from trunk and leaves serve as bonbons for the natives. The ants mentioned are as large as peas, clear as glass, pale-colored, and viscid.*

* Doubtlessly the honey-secreting individuals of *Camponotopus inflatus*, *Melophorus Bagoti*, Lubbock, or undescribed species.—[Ed.]

The natives eat anywhere, most frequently, of course, on the shady or sheltered side of their hut. They eat when hungry, and whatever is handy, even in the middle of the night the pounding of the roots being often heard. The principal meal is generally taken toward evening, when returning from the hunt and the *mana*-gathering. The women collect the fuel, carrying their *mana* and little children in troughs under the arms, while the bigger ones trot along beside them. When the food is ready it is eaten, and the duration of the meal is determined by the quantity of food available. The father tears up the meat, or cuts it with his stone knife, and throws a piece to each one—wife, children, &c. When the father has brought home any big game, onlookers in number appear, and also get a piece each. Certain of the women remain at home in turn to take care of the children, and are also supplied. There is often squabbling as to who shall act nurse, because they like best to stay at home. The natives eat of their stock as long as it lasts, and are gluttonous; but the meat must be well cooked, for they will not eat it underdone, and still less raw.

The natives to the south eat human flesh. It is said that they engage in regular human-hunting parties for this purpose. The father and a brother of one of our converts are said to have fallen victims to this practice, whilst the mother had a narrow escape. It is even said that they roast and eat their own infants, if they succeed each other too quickly. Only last year a woman not far from here did it, and when she was reproved for so doing, by means of an interpreter (for they speak a different language), she was surprised at being found fault with, as she considered the roasting and eating of her own child as something quite natural!

h. VISITING.

The natives are fond of visiting. The meeting place is usually the *tmara nkanja* for the men, *i.e.*, the bachelors' camp; whilst the women go to the *tmara lukara*, or women's quarter. They are extremely fond of narratives, or any news. When strangers arrive they become quite animated, receive them in style, and treat them as well as they are able, introducing them to those in the camp. The reception ceremonies have already been described, when treating of courtesy. When these are over they sit down together and begin to converse, the men congregating at one place the women at another. The latter have no household cares to divert their attention. They offer their guests just whatever they have handy; if they have nothing the guests get nothing, and take it as a matter of course, for it is as they would act themselves. The rule is that the *Beltara* treats *Beltara*, *Gomara* the *Gomara*, &c. Strangers usually sleep together at a separate

place. Next day the visitors stay in the camp while the hosts go hunting to obtain provisions for all. The following day the visitors also go out for that purpose, and usually, all together, after having eaten. Presents are always given to the visitors, such as a spear, *ulkuta*, or other thing. Something uncommon is preferred, such as a knife, pipe, tobacco, tomahawk, or even the shirt off their backs. They would rather go naked than allow their visitors to depart without a present, especially when they know that a certain article was much coveted. When taking leave invitations to return the visit are given, which are accepted and carried out, unless a murder in the meantime prevents it. For it occurs occasionally that spies mix with the visitors in order to gain information to allow of the execution of a pre-determined vengeance. The rejoicing is then converted into the most bitter grief, and friendship into deadly enmity.

i. SORCERERS.

According to their views all serious diseases are produced by demons, or by means of sorcery, and may be counteracted by various performances. These consist almost exclusively in sucking. The medicine- or *ngankara*-man applies his mouth to the affected part, sucks it, and then pretends to have extracted charcoal or other matter that had been inserted by sorcerers or demons. After each sucking, the *ngankara* goes a few paces aside, and spits it out with various ceremonies, putting his hand to the mouth and pretending to take out something, and to throw it away. Almost all the old or middle-aged men are such *ngankara*. According to their own account, they become such when they feel pain in the ears by night, pretending, and perhaps believing, that thus they have acquired the power. All the others believe it implicitly, and try to secure their assistance in all diseases. Usually they visit the sick without being specially called, and render their services gratuitously, being satisfied with the honor. If taxed with the deception practised, they look embarrassed, but find it difficult to discontinue the practice. In difficulties men are apt to look for visible and tangible aid; and others to pose as capable of helping.

k. GESTICULATION.

The gestures and pantomimic expressions of the natives are highly developed. They can express a great deal by means of most varied motions of the hand, and thus communicate with another.

l. VOWS OR OATHS.

Our natives have ceremonies by which they consider themselves bound. As an illustration the following anecdote will serve:—A few years ago they approached us anxiously and in great agita-

tion, and shouted "*tnenka bitjirirama*"—*i.e.*, enemies are coming. At first we would not believe it, until we espied a small troup of natives approaching. We now took up our weapons and went to meet them, whilst the others remained behind, though fully armed. Both parties were requested to lay down their arms, which they finally did, and we exhorted them to settle their differences in peace. After a long discussion some of either side sat down, embraced, and then cut small wounds into each other's backs, so that they bled. The four who did this were the intended victims out of revenge, and the avengers or intended murderers. No evil has befallen these four since.

m. MURDERERS.

These are looked up to as heroes, notwithstanding their cowardice and cunning; and death by spearing is counted as honorable, although they are so terribly afraid of it.

5. Family Life.

The family life of the natives is intimately connected with the social eight-class system. A youth cannot select a bride for himself, or a girl her bridegroom. The betrothal is solely and absolutely arranged by the father of the girl. He promises and contracts his daughter, within the limits of the class, to whomsoever he pleases, either to a *gamena* or *rendera*. The betrothal is often made by the father soon after the girl is born from mercenary motives, for it is seemly that the son-in-law prove himself grateful by frequently handing over to his father-in-law and his bride part of his hunting booty, and helping thus to provide for him in his old age. The bridegroom, *noatjinga*, is thus usually several, often many, years older than his bride, *kurkibana*, and cohabits with her sometimes when she is only seven or eight years old, and still a mere child. As soon as she attains puberty, he claims, and takes her away as his wife, without any initial ceremonies. He may, perhaps, present his bride with a *gulatja*, *i.e.*, necklace of rat-tails, her father with a spear, &c., and her mother with something else. The young woman builds a hut, and they live together afterwards as man and wife, no special festivities taking place. At most, the bridegroom may try to capture some game on their way to his camp, which they, if he be successful, consume together. If the young wife does not like her husband—a by-no-means unusual thing—she soon runs away from him; he follows her, and when caught gives her a beating to make her behave better in the future. Now, when the wife runs away, she goes to white people, and the husband does not venture to ill-use her, but has to wait until it pleases her to return of her own will, and then gladly enough receives her. Very often it happens that if the man has another, older, wife, she conceives a

grudge against the younger, and beats her. The husband attempts to maintain an armed neutrality with his stick. This sometimes causes the elder one to leave, which the husband allows, until he wants her, when he goes for her. This is usually when the younger one is far advanced in pregnancy, and is residing mostly at the *lukara*. As long as the husband does not reclaim her, the wife is considered to be a widow. Some married couples agree very well together, live frequently quite alone in solitude, and together provide for their wants. If a man has two or three wives, and one of them is troublesome, he will present her to one of his friends who belongs to the same class.

These natives believe that the souls of the infants dwell in the foliage of the trees, and that they are carried there by the good mountain spirits, *tuanjiraka*, and their wives, *melbata*. The nearest tree to a woman when she feels the first pain of parturition, she calls *ngirra*, as they are under the impression that the *guruna*, or soul, has then entered from it into the child. Such a tree is left untouched, as they believe that whoever should happen to break off even a single branch would become sick. But if the tree should be injured or broken down by winds or floods, that person would get ill whose *ngirra* the tree was.

When the infant is about to be born, the mother usually goes aside into the bushes, away from the hut. Her mother and sisters go to see her there from time to time, but especially the children, who are very inquisitive. The latter are not ordered off, and are often the only human beings present. When the babe is born, the mother cuts off the placental cord by means of two stones, at a length of several inches, rubs a little dirt on to it, and puts the infant in a trough beside herself. Water is never applied, and only the grossest impurities removed with some sand. Usually deliveries are easy; no fatal cases have ever been reported to us. As soon as the woman feels herself sufficiently recovered, perhaps in an hour or two, she gets up and walks about with the child in the trough under her arm. If twins be born of the same sex the youngest is killed, but if not, the boy is spared. Miscarriages occur very rarely. The mother waits several days before showing the father the child, by which time it has become somewhat dusky in color. Mothers suckle their children often until the third or fourth year, and if she is absent, another suckles it for her.

Of a proper training of the children they have no idea at all. They allow them to grow up wild. If the children are unruly, the mothers try to quiet them with fair words, or may scold them a little, or even slap them gently, but never take any extreme means. If children quarrel, and one mother ventures to strike the child of another ever so slightly, there is sure to arise a

disturbance between the two, followed by blows and the effusion of blood. When a child gets hurt, either by falling from a tree, or into the fire, &c., the women set up a terrible howling at once. The children show no affection for their parents, and sometimes leave them as early as at six years of age to rove about with others. Such a vagabond kind of life they love dearly, and, for this reason, delight much in riding about on horseback with white people. The girls are hard to train to domestic work, and the boys to any occupation binding them to a certain place.

When a child sickens, the mother takes it in her lap, and does not leave the spot, the father sitting near by; from time to time others join the group. If the illness becomes serious they begin to scream, and the women throw themselves over the patient, covering him with the upper part of their bodies, so that he is suffocated. The same is done with other persons when very seriously ill. But for this habit some might recover. An illustrative case came under our observation. The women having crowded over the patient as usual we drove them away, and gave the child some medicine. It got better, and is alive at the present day. Since then the natives have discontinued the practice, and always ask for advice in the illness of their children. When the patient has breathed his last the lamentations and mournings become accentuated. The eldest person in the camp shouts at intervals some five or six, long-drawn, mournful sounds in a deep bass voice, and with widely-open mouth. At the same time the others throw sand and ashes over each other, untie their hair so that it hangs in a dishevelled mass, the women lacerating their heads with their pointed sticks, and the men cutting each other's backs so that the blood flows. And why? They want to propitiate Death, so that he may not take them as well! There the majority crouch near the dead for a short while with the head hung low, while a few depart in haste to dig the grave. All persons present in the camp assemble at the place of mourning, the corpse still lying upon the lap of the mother or the wife or sister, and covered by the bodies of other women. The graves for men are dug by men only, those for women and children partly by men and partly by women, a sandy spot being selected for the purpose, situated at some considerable distance from the camp. The earth is loosened with the stick and thrown out with a trough, until the hole is four to five feet deep, and so wide that a man can work comfortably in it. Then an excavation is made at the bottom on the side toward their *tnara altjira—i.e.*, the place where the mother of the dead person was born—forming a lateral chamber. When the grave is finished the gravediggers step close up to the corpse, putting their long beards between their teeth, holding it firmly, and making the most grotesque

grimaces. Why? To frighten the ghost of the dead *ltana*, that he may not venture to injure them. Quickly the women are pushed aside, four persons seize the corpse and run with it to the grave, followed by the rest at some distance. On the way others relieve the first, proceeding rapidly onward. Arriving at the grave, one of the men jumps in, the bearers bend the limbs of the corpse against the belly, and hand it down to the man. The latter places it in the side chamber on its side, with the face directed towards the *tmara altjira;* the opening of the chamber is then closed with brushwood, and the grave filled up with earth. The body is placed in the side chamber so that no weight may oppress it, and induce the *ltana* to injure the relations, or remove itself quickly to the *tmara altjira*. Over the main hole of the grave a small mound is raised, and within a radius of several paces all bushes, wood, stones, and grass are most carefully removed. Why? That the ghost, *ltana*, may not find his way readily and hurry off to his *tmara altjira*. Everything is done in a furious haste, and when completed they return to their *tmara* and continue the lamentations. Soon after the hut of the departed is burnt down, with all his earthly possessions, that the *ltana* may not return and injure his kin or other persons. Moreover, the camp is shifted at once to another place for fear of the *ltana*. Next morning the nearest relations leave the camp for some weeks to forget their sorrow, or, perhaps, from fear. The next thing done is to smear the body with white earth—the women all over, the men only the face and chest—and to cut off the hair, in order to make themselves unrecognisable to the *ltana;* and is so effective that they are not readily recognisable at first. As long as the near relations are absent, little mourning and lamenting is indulged in, but as soon as they appear the mournful cries are renewed. Some days after, a number of the natives go to the grave very early in the morning to raise their lamentation there, place brushwood and bones upon it, and sprinkle it with water to satisfy *ltana*, and to induce him to consider that his dwelling, and inflict no evil. Finally white earth is placed upon or sprinkled over the grave that they may soon forget the dead one, whose name, indeed, is never mentioned again for fear he might hear it and do some injury. If others arrive from afar, they go first to the mourners and sit down with them, the women behind the men, the men behind the women, and those of the same sex beside or before each other, and show their sympathy with them by crying and lamenting for a while. When information is received that a man has been speared, or a man or a woman killed, &c., weeping, lamenting, and shouting at once begins. Such a dead person is buried by the finder, and the wife or wives are married by the brother next following in age. He does not assume an

additional burden by so doing, for they provide for themselves and their children. When he has something, he divides it with them, and in return receives his share of their *mana*. Orphans fare the worst, and usually the nearest relative looks after them, but does not assume a parent's position. Such children receive blows, and have to provide for themselves as best they can.

The avenging of a murder is the duty of the nearest relatives of the murdered person. But how do they know who committed the deed? This is an open secret, for all know the deplorable customs, and consequently each other's enemies. The murdered person and his relatives were perfectly aware whom he had killed, and the nearest relatives of the latter were his avengers, whom they knew well also, and, therefore, the murderer, *urana*. The practice of sorcery makes a slight difference, which will be explained hereafter. If the relatives of a murdered murderer considered that their father, brother, or son had deserved his violent death, all would be well, but this they do not by any means. They accordingly devise and plan how to inflict the same upon the *urana* of their own relation, or upon his next of kin, the *aruninja*. If it cannot be done at once—the brothers or children being, perhaps, yet too young—it is done in the course of time—being never forgotten. The most suitable opportunity is waited for; the murderer and his next of kin, perhaps, become careless, indifferent, or negligent; one of them lives, perhaps, alone for a time at a lonely place. If the avengers become aware of this, they leave at night, surprise, and kill him, for which purpose they paint the whole body a deep black. These avengers know perfectly well what fate awaits them, and that some day they will become its victims, and, therefore, there is no end to the feud. To this must be added the murders occasioned by their belief in sorcery. If the avengers—for almost always there are several, at least two, because no one ventures to go out alone upon a blood-hunt—succeed in obtaining the assistance of a number of abettors, and feel sufficiently confident of their overwhelming force, they attack their enemies by daylight, and are then called *tnenka*, on account of the open invasion; but *urana* if the deed is done secretly.

6. Government.

The natives around the mission station have a kind of government, being ruled by the aged men and medicine-men. It more often fails than not just where it ought to act, as, for example, in putting down the murders. On the contrary, these deeds are encouraged. This state of affairs arises from the fact that they form no nation, nationality, tribe, or triblets. Properly one can only speak of families among them, and these possess equal

rights as regards each other, only those families which are inter-related being more intimately united amongst themselves. But even among the related ones such murders may occur, as is shown by the following incident. There live here two distantly related families, the head of one of them having a second wife, who comes from the MacDonnell Ranges, who is rarely in this locality. Last year the old and solitary wife of the head of the other family went to the MacDonnell Ranges, as was her custom, and was beaten so severely by the other woman and her relations, that she succumbed to her wounds on her way back. For what reason? The daughter of the aggressor, by another long since deceased husband, had died shortly before. The old people and the sorcerers concluded that she had been killed by the son of this old woman by means of witchcraft. As this son was blind, and always stays here, they could not easily get hold of him, so the mother, or next of kin, had to suffer and die instead. The husband of this murderess is extremely irritated about it, and would like to go and punish his wife by beating her as severely. He has only abstained from doing this because we placed the consequences of such action clearly before him, namely, that he would beat her till she died, and then her relative would avenge her by killing him. It is a sad case where there is no proper government. It is only in a few instances that the authority of the aboriginal government can be perceived. Thus, when a new camp is to be pitched, or a settlement formed, the old people indicate the spot. Also, in the event of dissensions, an order or rule is obeyed preventing these from ending in murder, for under the influence of violent anger the natives have no self-control. Consequently as soon as two men become angry and proceed to high words, the others hasten to interpose themselves fully armed, to conciliate as much as possible, and even to part the disputants forcibly. As a result, the disturbance ends, usually in such cases, in the antagonists only inflicting wounds with knives or spears in the thick flesh of the thighs. Afterwards, the one who commenced using violent means, or, if it has not gone so far, the one who started the quarrel has to leave the place, and is practically exiled for a certain period. Knowing this rule, the guilty person starts voluntarily the following morning, without the least opposition, and when he returns everything is forgiven and forgotten.

There is also a law or rule in respect of widows. A widow must marry the younger brother of the deceased. The latter never objects, for men are always pleased to have as many wives as they can get, but it happens sometimes that the widow is not willing, and does not like the man. However, the *knirabata* and *ngankara*, old men and the sorcerers, try to enforce the rule by argument and persuasion, and, if this be ineffective, by scolds

and threats, the latter referring to their magic powers. These are the principal means whereby the aged and the sorcerers attempt to attain and retain respect and authority, and do gain it. The respect, which is paid them by the women and the younger members, is based on a belief that they do possess magic powers. Notwithstanding all this, it happens that widows do marry their favorites, and follow their own inclination, especially if the legitimate bridegroom does not possess the physical strength to compel compliance, such as being blind, lame, &c. Also, in arranging for feasts, the aged are priviliged, and are the principal organisators of such.

7. Religion.

The well-known festivals or dances of the natives, called by them *tjurunga* and *ildada*, are ordered and arranged by the old people. Each one of these has one or more of these *tjurunga* as his special privilege or monopoly. This right does not pass to his sons as an inheritance. When one of these ancients wishes to celebrate his *tjurunga* he consults with the others, and then messengers are sent by him to the neighbours, inviting them to attend at his *tjurunga*. The invitations are delivered by young men, who ornament themselves in the peculiar manner, explained above, and which renders them at once recognisable as messengers. In the meantime the men at home secretly prepare themselves suitably for the occasion, as no woman or child must see anything of it. The old man whose *tjurunga* it is orders everything to the best of his ability; he alone is supposed to possess the requisite knowledge or original inspiration. Thus one of them owns the *ilia tjurunga*, or emu festival; another the *jarimba tjurunga*, or fish festival, &c. These festivals are no mere pleasure-bouts, but serve another purpose, and have a religious significance. Their proper basis, I believe, is worship, or, more correctly, idolatrous service, and a consideration of the whole surroundings points to this conclusion. It must be mentioned here that the natives possess small disks of slate and wood, about as large as the hand, called *tjurunga arknanoa* (festival plates), which are secreted in caves, and which neither woman nor child must see. Upon these various markings are engraved, which the respective old man to whom they belong alone understands, describing the whole meaning of his *tjurunga*, as to its origin and purport. They pretend that these *tjurunga arknanoa* were *altjira*—that is, were not made—but I suspect, as they occasionally give some to white people, that the old men and sorcerers make them themselves. They also present some occasionally to the young men, and initiate them gradually into the whole secret meaning, and finally, I believe, into the whole system of deception. No one, however, ever reveals the fact, although one may read it in their faces. Why

not? They fear death; if discovered, it might cost them their life. If one attempts to deprecate the *tjurunga* of the old, it may happen one day that the traducer is killed for this offence, a case of the kind having occurred in the MacDonnell Ranges only a few years ago. The old one whose *tjurunga* it is explains its import and meaning to the uninitiated, and what is it? All the festivals refer exclusively to eating or to the supply of food, and it is pointed out whence the various objects as emu, fishes, &c., are derived; in what number and size they formerly existed, &c., which forms also the burden of their songs. These festivals serve as reminders, and extol the past, conjoined with prayers that these animals, &c., may again appear in the same numbers, of similar size, &c.

According to the nature of the *tjurunga* is the ornamentation of the body; thus for a fish festival the body is painted with fish-like figures, although the figures may be the same for several. The characteristic behaviour and cries of the respective animals is mimicked by the dancers, of which art they are really masters. Sometimes it happens that one or other does not celebrate his festival in his own district, but goes to another with his people, and holds it there that the other people may become acquainted with it. The preparation occupies them usually for days, sometimes for weeks, the chosen spot being cleared of all rubbish until it looks like a tennis-court. The head-dresses and the painting of the body requires also much time.

When everything is ready, the festival commences towards the evening. Women and children hurry towards the spot, and sit down together in a mass at one end of the arena, the men sitting in front of them. The chief old man and the festive dancers sit apart at a little distance. The singing, conducted by the on-lookers, begins. One or two dancers then step forward and execute a dance, consisting in keeping time to the singing by vigorous stamping with the feet, endeavoring at the same time to imitate the peculiarities of the particular animal that lends its name to the festival. After a while a pause is made, succeeded by the performance of another, and thus it goes on throughout the whole night, and for three or four nights in succession, while they rest and sleep by day. During the day the women have to provide the food for eating, and on this account such festivals are always held at a season when some article of food is to be had in abundance and within the immediate neighbourhood.

The following are a few of the native songs to show their form and contents:—

1. "*Titjatitjana jala ramana!*"
   "Large Emu, many tracks!"

2. "*Magatjagatjana werilankana!*"
   "Innumerable Emu have been here!"
3. "*Lambulambila laintjirbmana!*"
   "The name of a bird is upon mountain-sized water!"
4. "*Galbmantalanta janian gatitjalanta janian!*"
   "Honey much, Yes! yes! Very much; yes! yes!"

Most of the words of these songs are partly obsolete, and partly taken from other dialects. This explains why they are not understood by every one. One knows one song, another a different one, all being connected with the particular *tjurunga*, and derived from their ancestors. Their festivals of circumcision have not been seen by us. What I know of it is only by hearsay, hence I merely mention it. The youths are circumcised at puberty.

Respecting an after-life, the natives say that the souls of all go to *laia*. They cannot explain how this does not accord with the *tmara altjira*, and detailed when speaking about the burial.

By *laia* they understood a lake north from here, on whose shores the souls live, and eat the best of food, which, especially fruit, is found there in great abundance.

8. Superstition and Witchcraft.

The natives are very suspicious of impending evil, and have a great fear of death. Everything unusual or extraordinary in their opinion portends some danger. When an infant is born, its hair, and that of the mother, is cut off, so that both may recover quickly, and grow fat. The natives regard leanness almost as a disgrace, and on this account do all they can to become fat by taking care not to work too much, and lying about and sleeping, or strolling idly. To be able to eat much is accounted honorable, and he who can stow away the largest quantity is respected as a thorough man. Such a one boasts of it, and prides himself at being always hungry, and able to eat. The phrase "*jinga ngaiala nama*"—"I am hungry"—is used frequently, and with emphasis, even when a piece of meat of a pound weight or more has just been consumed. In order to get strong and fat, several cords of the hair of marsupial rats are worn about as thick as a finger, namely, a short, tight-fitting one around the neck, called *gulitja;* a longer one reaching down to the breast, called *matara;* and another, *gulitja*, around the upper arm. These cords serve likewise to fix the tufts of feathers.

The men sometimes cut off the hair of the dead, spin it, and make a kind of net of the thread, which is either worn around the neck, or in the bag under the belt over the hip. Great magic powers are ascribed to this *gururkna*, for he who has got one is always safe, and none can hurt or kill him. The greatest care is

taken of this charm; if lost, no pains are spared to find it again, and if not recovered, a feeling of insecurity remains. When about to set off on a journey they try earnestly to obtain one, or to borrow one for the occasion. For all that, however, it is astonishing how timid they are. If an unusual noise is heard at night they suspect enemies, even if it is only caused by a harmless animal; nay, when so alarmed, they often mistake trees, animals, &c., for enemies in the broad daylight. Their pernicious customs make this feeling of fear often only too well founded.

Twins portend evil, because uncommon, hence one of the infants has to die; it is said that some kill the boys derived from a white father.

If one falls sick or dies, the natives at once conclude he must have been bewitched, or bitten, or hurt by the devil—*eringa*. At the same time they think they can bewitch others, the old ones and the medicine-men especially fostering that belief. For this purpose they employ various magic agencies as charms, as the following:—

1. *Nguanja*, a stout, oblong piece of wood or bone, resembling a lead pencil, which, when of the latter substance, is made of the tibia, or big bone of the emu. At one end it is a little thicker and blunt, while the opposite extremity is thinner, and tapering to a point. This implement is thrown by the old men and sorcerers in the direction of their enemy to make him sick, or to kill him, as they imagine.

2. *Ntjala*, resembling the former in shape, but made of the shinbone of the kangaroo. The old man or sorcerer points with this at the enemy, who sits near his fire, at some distance, in order to sicken or kill him.

3. *Kwalja-kwalja*, a tuft of emu feathers, worn usually fixed under the belt at the back; it is supposed to protect them from their enemies, and to give the wearer strength to kill them.

4. *Dara*, a tuft of eagle feathers, serving the same purpose as the preceding.

5. *Lalkara*, a little implement about six inches long, and either of wood or bone, which is worn through the septum of the nose, and by means of which they also think they can hurt others.

Finally, in addition, they employ magic songs and spells.

Evil spirits and devils are combated in the same way as we have seen when describing the burial rites.

The following supplementary remarks may be added:—

If a person dies at night, men armed with spears place themselves near by to frighten *ltana* (the spirit), that it may bring no harm to them.

When eclipses of sun or moon take place they fancy that the devil (*erinja*) has placed himself in front of those bodies, and

throw their spears into the air in all directions, accompanied by great contortions of the body, in order to hunt *erinja* away.

The comets they consider are big men prognosticating ruin and death; these they bind by spells to one spot, so that they cannot get away, but must finally die.

When the Magellanic clouds are visible in the sky, they speak with a subdued voice, or not at all, for they are the poison-fangs of a gigantic snake. This is in order that the latter may not perceive them, else they might be seen, bitten, and die.

Even the whirlwinds are caused by the devil as he rushes through the air, and thereby stirs up the dirt, but they use no spells against them.

The innocent morning and evening stars are said to point out to the old men and sorcerers whom they are to bewitch.

Mongabarra are the souls of living people wandering about at night, seeking to withdraw the fat from the body of others, and to devour it. The mind of the natives being full of such thoughts, they frequently dream of them, and some pretend to have even seen such *mongabarra*. One native told us one morning a *mongabarra* had taken the soul of his granddaughter, but he had run after it, and recovered it again!

If it rains too long the old natives shout out their spells, and strike against the rain with their sticks to compel it to stop.

To the *albeta*—a tuft of tails of the marsupial rats which they wear upon the head—the old men ascribe the property of charming the boys so as to induce them to demand to be circumcised and be made men (*atua*). No doubt the magic force lies really in the open contempt shown towards these boys until they have been operated upon.

Geological Notes on the Upper Finke River Basin.

By Chas. Chewings, F.R.G.S.

[Communicated by Prof. R. Tate.]

[Read June 2nd, 1891.]

Plate X.

During the first three months of the present year I travelled in zig-zag fashion through and about the watershed of the Finke River, which takes its rise in the ranges near the centre of Australia; and such observations as I then made I now present to the Society, and in doing so, no one is so conscious as myself how incomplete and imperfect my efforts have been.

Pre-Silurian Rocks.

These are found freely distributed throughout the length and breadth of the MacDonnell Ranges. They extend to near the Western Australian boundary on the west, and to the Queensland boundary on the east. On the south the wall-like range, called the MacDonnell Range South, afterwards to be noticed, limits them in that direction; while to the north their extent is not yet known. Throughout they are highly crystalline in structure, distinctly stratified, with a dip in general to the north at a steep angle. Hornblendic rocks give the north side of the ranges and outlying hills a black appearance—on closer observation they weather into rounded masses, and crack in all directions, often circular. Mounts Hay and Chapple Ranges are composed of this rock. Feldspar (probably oligoclase) exists in the district, and I found garnets as well. Impure garnets form a constituent part of the hornblendic schist, which is closely compacted, massive, and intensely hard.

From the appearance of these rocks, the contour of the country, and the remarks made by the late W. C. Gosse and Mr. Charles Winnecke, F.R.G.S., on the Reynold's Range, situated some 90 miles to the north, and the late Colonel Warburton's remarks on the country to the westward and north-west, I am assured that the country now known as the Burt Plain, and from that to the Reynold's Range, has been denuded, and is now many thousands of feet lower than it originally was. It probably averages not less than 2,000 feet above sea-level. This land, which is now a

level expanse of plain and drifting sandhills, with here and there low bluff hills and salt marshes dotted over it, was at a subsequent period to the Silurian upheaval the highest tract of land in Central Australia.

When the quartzite capping, which will shortly be noticed, became denuded, the pre-Silurian rocks weathered away much faster than the rocks to the south, which are partially in places and wholly in others covered by Silurian quartzites; thus we have high land still where quartzite exists, and lower land where it has been denuded.

The southern edge of the Burt Plain is bounded by an escarpment of crystalline rocks consisting principally of chlorite schists and granite; the escarpment rises abruptly to an average height of 800 to 1,000 feet. These remarks refer to that portion of the range from Mount Zeil to near the Alice Springs. The drainage to the north is short, but the southern drainage starts immediately from the top of the range. This ridge is really the watershed of the MacDonnell Ranges, though higher peaks and ranges exist some few miles farther to the south.

Micaceous schists and metamorphic granite follow on in regular sequence to the south, with occasional outcrops of coarse eruptive granite and other eruptive rocks. Long ridges of hard white quartzite nearly vertically disposed, and dipping comformably with the schistose and stratified granite-rocks run through the country east and west, and form absolutely impassable barriers to the traveller, saving along the creek-channels, which intersect them. These ridges form the highest ranges in the MacDonnell, and mark the lines of faults, which are frequent. Mounts Zeil and Liebig are exceptions, being formed of metamorphic granite. Then follow metamorphosed clays and shales interstratified with yellow and blue crystalline limestone, which conclude the series. In the neighbourhood of these rocks there are marks of great erosion and denudation. Prior to the great Silurian upheaval, hereafter to be mentioned, these rocks were overlain by more than a mile in thickness of Silurian quartzites, limestones and shales; the only remnants of which are the ridges and patches of quartzite and limestone. In the neighbourhood of the granitic dykes the Silurian remnants are much scattered.

Mica is abundant in both eruptive and metamorphic granite, and I feel sure marketable sizes will be found much farther to the west than that discovered at Hartz Range. Quartz reefs are of frequent occurrence throughout the granite and schistose rocks, but I regard the western end of the MacDonnell as a splendid field for the prospector. Topographical surveys and a critical examination of rock specimens can alone determine accurately moot questions on the pre-Silurian rocks of Central Australia, and particularly of the MacDonnell Ranges.

Silurian Rocks.

The "MacDonnell Ranges South" form a barrier to and rise abruptly from the limestone and shales of pre-Silurian age. I failed to detect any unconformability between them. The escarpment is formed by the denudation of the limestones and shales. It is my opinion that when these rocks were in course ef formation, the pre-Silurian rocks were horizontally disposed, otherwise I do not think faults could have occurred and placed such long narrow quartzite ridges in their present positions to the schists had the angle of unconformity been great.

The area over which this formation extends has not been determined in many directions, but sufficicnt is known to be able to say that it approaches the Musgrave Ranges on the south; on the west it extends well on towards Lake McDonald, on the east to beyond the Hale River, and on the north to and inclusive of the MacDonnell Ranges South. There is every probability that beyond these limits the formation stretches to the south-west, to the north-west, north-east, east, and west, over considerable areas, as I am persuaded from the notes of Gosse and other explorers that it extends to and is largely represented in the Mann, Tomkinson, Petermann, and other Ranges; and much of what has been termed "desert sandstone" must be classed under "Silurian." Similarity of physical structure alone has led to errors.

Two axes produce the Upper Finke basin. The larger and more important runs east and west through the heart of the MacDonnell Ranges. At the time this upheaval transpired the Silurian quartzites were largely represented over the area now occupied by the basin, as proved by fossil and stratagraphical evidence; and were by lateral pressure formed into anticlinal and synclinal folds, which run nearly east and west. With one exception, viz., that of an eruptive outcrop, it forms the bed rock of the basin. The second and lesser runs in a north-westerly and south-easterly direction, and junctions with the first near the western end of the MacDonnells, forming an oblique plication of the Silurian foldings, and also the "basin." The latter determines the western watershed, and the former the northern, of the Finke River and its tributaries. To the north and west of these axes small creeks in comparison with the Finke and its tributaries take their rise, run out into sandhill country, and soon are lost. The Finke may be said to follow the lowest part of the basin, and, like its tributaries, maintains a south-easterly course, occasionally breaking through from one synclinal fold to the next farther south.

To return to the anticlinal and synclinal folds within the basin. How wonderfully even the pressure has been can scarcely be

imagined; it must be seen to be fully understood. Not only has the pressure produced foldings of great regularity, but now that many of the anticlines are partially denuded it would be difficult to conceive of strata more evenly and beautifully formed. It is the rule, in fact, where the strata stand at all vertical to find high parallel wall-like ranges reaching for miles, sometimes for scores of miles, through, across, or over which the traveller cannot go. It is possible to ride the whole length of the ranges between walls of rock that tower up perpendicularly on either side, and meditate on the time when the narrow plain through which he rides was once filled with limestones, shales, or other rock equally fragile in comparison with quartzite. This description applies wherever the strata are sufficiently vertical, and no newer formation overlies and fills the denuded space.

The folding is traceable to the south and east until covered by Cretaceous and Tertiary formations. The first synclinal forms the valley now called the Missionaries' Plain; it runs from Gardiner's Range to the Hale River. Looking from this plain to the northward the MacDonnell Ranges South rises almost vertically a thousand feet out of the plain; it has a few foothills, which will be noted hereafter, and designated "Pudding-stone Hills." They attain to, if not over, 3,000 feet above sea-level, and all the ranges of crystalline rocks lying behind and to the north of it are hidden from view. Only a few peaks and tops of the highest ridges as they rise a thousand feet higher can be seen. It is thought that many of the highest peaks of the MacDonnell exceed 4,000 feet above the sea, but if I am not mistaken Mount Giles will be found to be the highest elevation. There are four passes through the MacDonnell Ranges South in a distance of 150 miles, viz., Temple Bar, Ellery's Creek, Finke Gorge, and Mareena Bluff, the latter being near the western end. At the three first-mentioned the strata stand nearly vertical, but in the latter inclined to the south, and some 20 miles has to be travelled before the five miles of range in a direct line north and south can be crossed. Travelling northwards through the pass a wide valley is entered. On the western side a horse could walk up the incline to the top of the nearest cliff; to the east towers up a bold headland a thousand feet high at least. The view from near the entrance to the pass is graphically described by Mr. Ernest Giles, F.R.G.S.* The track leads under receding bluffs on the right; the valley gradually closes through the strata becoming more vertical, and eventually a way is found to the north through a creek-gorge by which the pre-Silurian limestones are reached. Apart from the grandeur of the pass, the strata at this place are

* "Geographic Travels in Central Australia," 1875, p. 22.

so inclined that they can be examined to great advantage, thanks to the quartzite cappings.

It was underneath these bluff-shaped headlands of quartzite that I noticed fragments of fossils amongst the talus, and on climbing-up under one of the bluffs, I discovered some hundreds of feet thick of fossiliferous limestone in thin beds, with intercalated dark-green shales. The limestone was almost wholly composed of fossil shells. I believe they may be had underneath any of the bluffs, and for a distance of 15 or 20 miles without a break. I also found fossils of the same age at the head of both the Walker and Petermann Creeks, which have their commencement on the top of anticlinal folds. The quartzite has been denuded sufficiently to expose the shales and limestones, which have eroded faster than the quartzite sides, and thus a valley has been formed.

A few miles to the west of Mareena Bluff Pass a fault appears on the south side of this range, and exposes a headland of quartzite 1,000 feet thick, horizontally bedded. Wherever this formation is met with the cleavage is most perfect, and where the sandstone remains unaltered, flag-stones of any size may be had.

It would appear that symmetry is the order throughout Central Australian, if not Australian rocks generally. Generalising may be more safely dealt in than in most parts of the world. How regular are the Cretaceous clays and Tertiary rocks overlying them. The Ooraminna (Devonian?) Sandstone is recognisable at a moment when once its characteristics are known. The anticlinal and synclinal foldings of the Silurian formation maintain such good parallels, that when several sections across them are taken, even a few insignificant outcrops appearing above the recent wind-drift sand, connect without fail the lines of folding. The chief upheaval in Central Australia occurred towards, if not at, the close of the Silurian epoch. It was then that the MacDonnell Ranges assumed their general present shape, and the Upper Finke Basin took on much of its present form. In the synclinal fold, in which Tempe Downs Station stands, was next deposited a rock at least 2,000 feet thick, described as

DEVONIAN—(1) MUDSTONE AND (2) OORAMINNA SANDSTONE,

on the top of which, and conforming to it, was laid at least 2,000 feet of sandstone—the middle stratum may be described as a highly ferruginous fine-grained sandstone, and the present uppermost formation a red friable coarse-grained sandstone; sometimes white and feldspathose. It does not conform to the Silurian rocks, and has been only subjected to slight longitudinal pressure in comparison with the Silurian. It has, however, taken

on in some measure the anticlinals and synclinals of the older rocks. As the horizon cannot be determined until fossils are found we must wait their discovery.

The characteristics of the Ooraminna Sandstone are bold headlands, precipitous sides for 800 feet, cleavage indistinct. It is usually found in localities protected within the synclinal folds of the Silurian quartzites. This extensive formation at one time covered up the James, Gardiners, Geo. Gills, Lewis, and other Ranges, and much of the MacDonnells, not to speak of localities farther afield. The Finke runs over many miles of it, and in the precipitous walls which rise 800 feet on either side the river-bed I saw, when not distant from MacDonnell Ranges, pebbles freely embedded in the sandstone. Flanking the South MacDonnell in the form of foot-hills, but unconformable to the Silurian rocks, are long ridges of pudding-stone extending some 70 miles east and west, and in strike parallel with the Silurian rocks. I noticed at the Gilbert Spring, situated west of the Lutheran Mission Station, pudding-stone similar to that just referred to, and think it highly probable that when the Devonian (?) sandstone was being deposited the MacDonnell Ranges were higher from their base than they are to-day, though probably islands in the sea; the waves dashing against the rocks broke off fragments and distributed them over that part of the basin nearest the MacDonnell Ranges, and thus were formed the pudding-stone hills. I consider it probable the red sandstone and the pudding-stone, which are conformable, are one and the same formation. The part that is left can only be called a remnant of what once existed. In many places near the MacDonnells so much mica is in this rock as a constituent that it glistens in the sunlight. Prior to the deposition of this formation the MacDonnells had been denuded in places of all Silurian formations, for I saw a hill of *pre*-Silurian schists capped by mudstone. The capping of mudstone was dark-red in color, and on climbing to the top of the hill I found the strata were twisted and compressed into almost every conceivable shape.

This brings us to the second series of foldings that Central Australia has undergone. I do not think in this instance there was any great upheaval; nor, for the matter of that, do I think there was in the Silurian upheaval; in both instances lateral pressure from the north disturbed the strata, and in this Devonian (?) disturbance the Silurian and pre-Silurian strata were horizontally compressed into sharper folds, the extent of which is indicated by the gentle anticlinals and synclinals of this formation. Between the Silurian and the Devonian, if we may judge by the appearance of the rocks, there was a wide break, and I saw no intervening strata; on the contrary, the mudstone

and sandstone abutt right on to the Silurians. Subsequent to the Devonian (?) epoch, it is evident that the MacDonnells were meanwhile degraded to their present level, or nearly so, for out of the valleys in the heart of the MacDonnell rise flat-topped hills, chiefly of coarse sandstone rock frequently porcelainised. Mr. H. Y. L. Brown has expressed the opinion that they may be of

MESOZOIC (?)

age. The strata dip south, as a rule, but sometimes to the north. In the valley in the MacDonnell on which Glen Helen Station stands a few miles of this formation is exposed, but it is being fast eroded. It is probable the horizon will prove to be early Mesozoic. Again, on the sides of the Silurian anticlinals in the James Range remnants of a deposit, containing a large percentage of manganese and iron, resemble these hills in the MacDonnell, as also do several hills in the valley of the Finke, where it debouches from the ranges on to the Great Southern Plain and in other places. A striking resemblance in the dip is noticeable wherever these hills are met with, and they are seen to dip beneath the clays of the Lake Eyre basin.

I have now to record the third series of foldings, and it was lesser than either the Silurian or Devonian (?), and may be termed the "Mesozoic" upheaval.

CRETACEOUS.

How much folding has gone on since the Cretaceous clays of the Lake Eyre basin were laid on is a matter for conjecture, but from exposures I saw near the junction of the Finke and Hugh Rivers, I judge it has undergone slight folding. I saw no trace of this formation within the range-country—it has been pierced where only a few feet thick at the junction of the Palmer and Walker Creeks, and also to the south of that in wells. A limestone-rubble closely compacted with flints and gypsum is the characteristic of this rock on its northern edge, where it rests unconformably on the supposed earlier Mesozoic rocks.

Resting, I take it, unconformably on these rocks, without any very marked change in appearance, and horizontally stratified, next follows the supra-Cretaceous or

TERTIARY

formations, so noted, so weary to travel over. For a description of which I must refer those interested to a paper read before this Society on April 2nd, 1889, by Mr. J. J. East, F.G.S. His travels led him over the eastern part of the MacDonnells, mine the western. For the most part he travelled outside of the Finke valley. In that paper mention is made of some white gritty hills

with porcelain cappings situated within the MacDonnells near the Elder River. I saw numerous hills of a like character throughout the ranges in my travels. At the extreme head of the Petermann Creek resting on fossiliferous Silurian limestone, and on the Walker Creek resting on mudstone, it may be seen. As a rule the hills are cone-shaped, very white, composed of clay-grit, and always horizontally disposed. There is a difference of 2,000 feet in altitude between the counterpart of these hills in the neighbourhood of Lake Eyre. The interesting problem is, were these hills formed by wind-drift? or were they formed beneath the sea? If from wind-drift, their great elevation is easily accounted for; if on the contrary a marine deposit, it is quite evident Australia was beneath the sea at no very distant geological data. Following on this version, what has become of this immense deposit? and to where has it gone? and by what way? It is so friable that as the waves of the sea gently receded it would be lapped away, and by ocean currents carried to the bottom of some other ocean. But why was Lake Eyre and its basin not filled? or more correctly, why is it a depression? Should not this formation fill it to overflowing? To this may be added that it is evident pre-Silurian and Silurian rocks form the bedding to Lake Amadeus not many feet beneath the blue clay, and farther to the east granite outcrops occur near the western watershed of the Finke. It is possible an ocean current swept through and along this valley, and coming in contact with the Flinders Range rocks carried off all sediment collected on the way, and much of what was already in Lake Eyre basin, which great vortex was probably formed at the close of the Silurian epoch. What treasures of wealth that basin holds can only be told by the diamond drill, but from the fact that coal has been struck at Leigh's Creek, and that the rocks surrounding it on the north and north-west dip into it, it is possible that coal may be found in many places around its edge. To come to a

Conclusion.

The fact is everywhere apparent that rapid degradation is going on throughout Central Australia, especially where the hard rocks are more exposed on the high-lands. The extremes of heat by day, and almost invariably cold nights, cause much contraction and expansion, and the rocks break up. When sufficiently broken the wind, which throughout the summer months blows from the east, carries the sand along and forms sandhills as even as ocean waves. The wind is here a great factor in the transport of eroded rocks, much greater than flood-waters. So porous is the soil that moisture sinks beneath the surface at once in the sandy country, and flows to lower levels. In a few instances an anti-

clinal brings it to the surface again, but instances are not frequent. A note on the fossils discovered by me has been supplied by Professor Tate, appended herewith, and to whom I am also indebted for a determination of the rock specimens.

NOTE ON THE FOSSILS BY PROFESSOR TATE.

1. FROM the HEAD OF WALKER CREEK and MAREENA BLUFF :—
   Orthoceras sp., related to *O. excentricum* ; a cast.
   Raphistoma ? sp.; casts of three examples.
   Strophomena sp.; allied to *S. funiculata*, McCoy, but the primary ribs bifurcate.
   Phacops sp.; a tail-piece about $1\frac{1}{4}$ x $1\frac{1}{3}$ inches, composed of at least six segments.

2. FROM PETERMANN CREEK :—
   Orthoceras sp., allied to *O. imbricatum*, the siphuncle very excentric.
   Orthis flabellum.

There is no community of species between the two localities, though at both the facies is decidedly Silurian. The generic determinations of the Mollusca, though probably correct, are based on external resemblances, and therefore subject to revision ; the reference of the Trilobite-tail to *Phacops* is perhaps less reliable. This uncertainty of the exact generic location makes any specific determination somewhat untrustworthy ; and until a larger number of species have been collected it will be desirable to refrain from an attempt to correlate the formation with any greater degree of definiteness, though the balance of the meagre evidence is in favour of Upper Silurian.

Note on a Volcanic Ash from the Island of Tanna, New Hebrides.

By Prof. Rennie, M.A., D.Sc., and Mr. E. F. Turner.

[Read August 4, 1891.]

The volcanic ash of which we give an analysis below was forwarded to one of us by the Rev. W. Gray, missionary to the Presbyterian Church of South Australia, in the island of Tanna. The ash was collected at a distance of several miles from the volcano. The following is an extract from Mr. Gray's letter on the subject:—"The cone on the island of Tanna is about 600 feet high. The crater basin, oval in shape, is about a mile in circumference. It is about 200 feet deep, and contains several vents, from which eruptions take place every three minutes or so. The dust is thus thrown out, and carried for more than 20 miles. The heavier stuff falls nearer the cone, the lighter farther away. But the output of dust varies much in this respect. Sometimes there is very little rough stuff in it; sometimes it contains a large proportion of clear white particles. The dust, when accompanied by rain, destroys some kinds of vegetation. It makes water hard, and curdles milk." Mr. Gray also states that the fine "hairs" which it often contains are called Pele's Hair, Pele being the goddess who presides over a volcano in the Hawaiian Islands.

With regard to the destruction of vegetation, the making water hard, and curdling milk, there can be little doubt that these effects are due, not to the ash, but to acid vapours emitted by the volcano during eruption, and carried down with the rain, especially as quantities of sulphur are known to exist in conjunction with the volcano.

The following figures are the mean of those obtained in two closely-agreeing analyses:—

Silica (SiO_2)	57·30
Alumina (Al_2O_3)	17·96
Ferrous oxide (FeO)	5·04
Ferric oxide (Fe_2O_3)	1·56
Manganese oxide (MnO) ...	·36
Lime (CaO)	8·22
Magnesia (MgO)	3·60
Potash (K_2O)	2·60
Soda (Na_2O)	2·80
Phosphorus pentoxide (P_2O_5) ...	·47
	99·91

Descriptions of New Species of Australian Mollusca, Recent and Fossil.

By Professor Ralph Tate, F.L.S., F.G.S.

[Read September 8, 1891.]

Plate XI.

Genus Siphonalia.

It is generally admitted that *Siphonalia dilatata*, Quoy and Gaimard, and *S. Tasmaniensis*, Adams and Angas, are two sufficiently distinct species; with respect to a third species, *S. maxima*, Tryon, in Manual Conch., 1881, p. 135, t. 54, fig. 355, some doubt has been expressed as to its validity, and after lengthened study of considerable material, having traced-up specimens of *S. Tasmaniensis* from three-fourths of an inch in length to those of seven inches, I have no hesitation in regarding *S. maxima* as the senile stage of *S. Tasmaniensis*.

The species inhabiting South Australian waters are:—

Siphonalia dilatata; *Fusus dilatatus*, Quoy and Gaimard, Voy. Astrolabe, t. 34, figs. 15-16.

This is recorded from Encounter Bay by Angas, 1865, where it is rare.

Siphonalia Tasmaniensis. Adams and Angas *(Fusus)*, Proc. Zool. Soc., 1863, p. 421, t. 37, fig. 1.

S. maxima, Tryon, op. cit.

This has a much longer spire than the preceding, narrower body-whorl, less sharply angulated, with more numerous and obtuse tubercles on the keel.

The species was first recorded by Angas from Hardwicke Bay, where it is a common shell; it also lives among stones at extreme low tides in Encounter Bay.

Siphonalia pyrulata, Reeve *(Fusus)*, Icon. Conch., t. 13, figs. 50*a*-50*b*

The type is from Tasmania, but it also occurs in Port Phillip Bay, and, according to Angas, in Spencer-Gulf.

Siphonalia sulcata, *Lamarck*, sp.

Fusus sulcatus, Lamarck, An. s. Vert., vol. 7, p. 125, 1822.

Siphonalia (Austrofusus) sulcata, Tryon, Man. Conch., 1881, p. 138, t. 56, fig. 380.

Fusus ustulatus, Reeve, Icon. Conch., t. 17, fig. 66; *id.*, Tryon, *loc. cit.*, p. 66, t. 39, fig. 170.

Judging by the figures representing the Lamarckian species, I am constrained to regard *F. ustulatus*, Reeve, a synonym of it. No locality was known to either Lamarck or Reeve; but Angas recorded *F. ustulatus* from St. Vincent-Gulf, where it has occurred to other collectors in later years. Tryon quotes *S. sulcata* as from South Australia. I have seen Victorian examples of the species.

Siphonalia oligostira, *spec. nov.* Plate xi., fig. 6.

This species resembles *S. Mandarina*, Duclos, of the New Zealand fauna, but the revolving threads on the body-whorl, in particular, are flat and without interstitial threadlets; the whorls are not so regularly convex, being slightly angulated postmedially; the spire is proportionately much broader, and the nucleus consists of one and a half very small turns, whereas in *S. Mandarinus* it is cylindrical, of four whorls.

The species makes a passage between *S. Tasmaniensis* and *S. Mandarinus* in its faint shoulder and obsolete nodosities thereon.

Dimensions.—Length, 88·5; width, 42; length of aperture, 56 mm.

Living on rocks at extreme low tides, Guichen Bay *(S. Aust. Mus.)*; Encounter Bay *(Dr. Verco)*.

GENUS LATIROFUSUS, *Cossmann.*

This genus was established by its author in "Annales de la Soc. Roy. Malacologique de Belgique," 1889, p. 175, to include certain shells having the outline of *Fusus*, the plicated columella of *Latirus*, and a globulose embryo. He referred to it the living *Fusus lancea*, Chemnitz, which probably includes *F. acus*, Adams and Reeve, and two species of *Fusus* described by Deshayes from the Eocene of the Paris basin. I venture to describe a second recent species.

Latirofusus nigrofuscus, *spec. nov.* Plate xi., fig. 3.

Shell lanceolate-fusiform, three and a half times as long as wide, aperture one-half of the total length; colour brown under a black epidermis.

Whorls seven and a half; nucleus of one and a half whorls, smooth, hemispheric, and large.

Spire-whorls separated by a linear suture, almost flat, spirally lirate; commencing liræ two, increasing to seven, eight or nine on the penultimate whorl, four of which are usually stouter than the interposed ones. The transverse ornament consists of obscure rounded plications (or they may be wholly obsolete), and of

minute threadlets separated by slightly wider intervals than their width.

Last whorl with a rounded periphery, ornamented with slender transverse threadlets and stout spiral threads, the latter alternately large and small, about 15 in number, or the intermediate ones nearly equal in size to the primaries. The base is rather abruptly contracted into a moderately long, but stout, canal, ornamented with about eight distant spiral liræ, and transverse threadlets. Aperture narrow-elliptic; outer lip lirate within. Columella with two oblique plaits, the anterior one at the origin of the canal; canal nearly closed by a horizontal plate-like extension of the border.

Length from 21 to 22; breadth from 6 to 6·5 mm.

Dredged in life one and a half miles off Edithburgh, St. Vincent-Gulf, in three to four fathoms, by Mr. E. H. Matthews; also in shell-sand, Aldinga Bay (*Kimber*); Hardwicke and Encounter Bays (*Adcock*).

Diala magna, *spec. nov.* Plate xi., fig. 9.

Whorls nine; apical whorls two and a half, convex, rapidly diminishing, purplish-black; spire-whorls flat, excavated at the suture, slightly incrassated at the anterior suture, smooth, shining, whitish interrupted by axial flames of reddish-purple.

Penultimate whorl with one to three spiral grooves bordering the anterior suture; the colour-stripes on the grooved surface being broken-up into dots.

Body-whorl with a rounded base; the anterior two-thirds with about nine encircling flat ridges, not so wide as the intervening flat furrows, spotted with purplish-red in the sulci; on the posterior one-third the sulci are obsolete and the colour-spots are confluent but in an alignment with the anterior dots; the whole forming axial bands sigmoidally curved, extending from the suture to the extreme front. Growth-lines fine and regular, conspicuous on the base. Aperture subrotund, outer lip thin, peristome incomplete or thinly continuous, columella simple.

Length, 13·0; breadth, 4·5 mm.

Habitat.—Deep water, Port Phillip Bay, Victoria (*J. M. Wilson*).

This species is at once distinguished by its size, its furrowed suture, and the flat distant ribs on the base. Its nearest ally is *D. lauta*, A. Adams, certain individuals of which have a slightly channelled suture, but the basal sulci are linear, and the colour-spots never confluent. Its rounded base separates it from *D. suturalis*, the only other species with distinctly-furrowed suture; whilst the arrangement of the colour is not seen in any other species.

RECENT AND FOSSIL SPECIES OF LEIOPYRGA.

This genus, founded by Messrs. Adams in 1863, differs from *Bankivia* by its umbilicus. Two living species, both Australian, were described by H. and A. Adams, which remain till now the only representatives of the genus. I have to add one recent species and two from the Older Tertiary of Victoria.

A synopsis of the specific characters is as follows :—

Shell smooth ; earlier spire-whorls subquadrate. *L. picturata.*
Shell with spiral ribs.
Ribs on penultimate whorl, three. *L. cingulata.*
Ribs four, truncated, equal, equidistant ; suture excavated. *L. quadricingulata.*
Ribs three, equal, wavy, with a small one at each suture. *L. Sayceana.*
Ribs eight to ten. *L. octona.*

Leiopyrga picturata, *H. and A. Adams.*

L. picturata, H. and A. Adams, Ann. Mag. Nat. Hist., 1863, p. 19 ; id., Angas, Proc. Zool. Soc., 1865, p. 181 ; 1867, p. 216.

Bankivia (Leiopyrga) picturata, E. A. Smith, Zool. Alert, p. 75.

Trochus (Leiopyrga) picturata, Watson Challenger Gastr., p. 65.

Cantharidus (Leiopyrga) picturata, Tyron, Man. Conch., vol., xi., p. 140, t. 45, figs. 46-48 (1887).

Adams' type is from Port Jackson, where the species is well-known ; Angas reported it from St. Vincent-Gulf, but it has not since been collected in South Australian waters.

Leiopyrga cingulata, *A. Adams.*

Ref.—Proc. Zool. Soc., 1863, p. 507. *Cantharidus (Leiopyrga) cingulata*, Tryon, *op. cit.*, p. 141. Port Essington.

Leiopyrga octona, *spec. nov.* Plate xi., fig. 5.

Shell turrited, narrowly perforate, thin, shining, white, with oblique or axial zigzag pinkish lines.

Whorls eight and a half, moderately convex, separated by a linear suture ; the apical whorls two and a half, turbinately depressed, rufous, smooth. The first two spire-whorls smooth, the third showing faint spiral lines, which increase in strength with the revolution of the spire ; the anterior whorls with about eight to ten equal and equidistant, rounded, and rather depressed cinguli, which are a little wider than the furrows.

Body-whorl equally and regularly cingulated, base convex ; aperture oval ; outer lip thin, crenated on the margin; columella

thin, but slightly thickened above, and abruptly attenuate to the front, not perceptibly reflexed; umbilical groove smooth.

Length, 10; breadth, 4·5 mm.

Habitat.—Royston Head, South Yorke-Peninsula (one ex.); King George Sound (one ex.).

This species resembles *L. picturata* in outline, but differs by its conspicuous cinguli, its convex whorls, and linear suture; from *L. cingulata* it would seem to differ in shape and in its numerous encircling ribs.

Leiopyrga quadricingulata, *spec. nov.*

Shell turrited, narrowly perforate, thin, internal shell-layer conspicuously perlaceous.

Whorls eight and a half, flatly convex; apical whorls two and a half, smooth, depressed-turbinate; the next two are quadrate, margined at the suture; the following, with an excavated suture, four-ribbed. The ribs are equal, equidistant, compressed, moderately elevated (sometimes having an undulose outline), separated by much wider flat furrows.

Last whorl usually with intermediate smaller ribs between the primaries; periphery rounded.

Traces of colour are visible on some specimens, consisting of a diffused purplish tinge on a white ground.

Length, 11; breadth, 6 mm.

Habitat.—One of the characteristic fossils of the Miocene-Tertiary at Muddy Creek; also at Kalimna, Gippsland Lakes, Victoria.

Leiopyrga Sayceana, *spec. nov.*

Like *L. quadricingulata*, but the penultimate whorl has three primary, compressed, acute cinguli, equal and equidistant, and a slender thread at each suture. The cinguli have an undulate outline by reason of inconspicuous arched folds which traverse the width of the whorls. All the spire-whorls are cingulate; the suture is more or less concealed by the approximation of the sutural threads.

Length, 11; breadth, 5·5 mm.

Habitat.—In the Eocene-sandstone on the beach at Beaumaris, near Cheltenham, Port Philip Bay, Victoria; not uncommon, according to Mr. Sayce, to whom I am indebted for several examples.

Semele monilis, *spec. nov.* Plate xi., fig 7-7a.

Shell ovate-oblong, somewhat compressed, thin, inequilateral, subinequivalve (the right valve slightly flatter than the left). Anterior side the longer, rounded; the posterior side shorter, obliquely truncate in the ventral-half. Ventral margin arched

medially, gradually curving upwards to the rounded anterior extremity, abruptly sloping upwards and outwards to join the post-dorsal slope.

Umbos depressed, acute, approximate: lunule very small, but deeply impressed, broadly lanceolate. The ornamentation consists of rather distant, moderately elevated, rounded, concentric liræ; and of thick radial threads, separated by nearly as wide flat furrows. The radial threads pass uninterruptedly across the liræ, where by reason of minute crenulations on the lateral faces of the threads, the appearance of punctated furrows is produced. There are six liræ within a breadth of 5 to 10 mm. from the umbo; the crenulations on the liræ are about 35 in a length of 5 mm. at a distance of 10 mm. from the umbo.

The external colour is a pale-yellow to dirty-white, tinged here and there with rosy blotches having a disposition in the medial and posterior areas to run into flames. The interior is pellucid, changing to opaque-white towards the margin, variegated with blotches and short streaks of a reddish-colour.

Dimensions.—Antero-posterior diameter, 21; anterior radius, 11; posterior radius, 10; ventro-dorsal diameter, 17; thickness at a point a little dorsally to the middle line, 7 mm. A large specimen measures 27·5 by 23 mm.

Habitat.—Cast-up valves at Aldinga (Mr. Kimber); at Moonta Bay (Mr. McDougall). Fresh shells dredged from 17 to 18 fathoms in Yankalilla Bay by Dr. Verco.

Tellina Vincentiana, *spec. nov.* Plate xi., fig. 10.

Shell small, thin, dirty-white, slightly inequivalve (the right valve more convex), considerably inequilateral, the anterior side longer, irregularly ovate, narrowed and pointed behind. Ornamented with close, short, erect lamellæ, becoming fewer and more elevated on the post-dorsal slope, distantly radiate-striated in the interstices; the lamellæ increase in number by bifurcation at about the middle of the valve, again to unite in pairs close to the front margin.

The front-dorsal margin is a very little convex, and only slightly oblique, the post-dorsal margin being almost rectilinear and very slanting; the ventral outline is broadly arcuate, more rapidly up-curving in front than behind, posteriorly it has a slight incurvation.

The umbones are small, acute, and a little elevated.

There are two cardinal teeth in each valve, one of which is bifid, and two well-developed lateral teeth in the right valve; the pallial sinus is wide, fused to the pallial line, and extends across the valve to near the adductor scar.

Dimensions.—Antero-posterior, 15·5; umbo-ventral, 12; sectional diameters, 5·25 mm.

Locality.—St. Vincent-Gulf, in 17 to 18 fathoms (*Dr. Verco*).

This species is related to *T. languida*, E. A. Smith, but it has a lamelliform and not striated ornament. Mr. Brazier reports to me that "the species is quite new; it is smaller, and allied to *T. margaritina*, Lamarck, from King George Sound; it is a great deal smaller, and in miniature like *T. ostracea*, Lamarck, from India." The dentition of *T. Vincentiana* will not justify its inclusion in the subgenus *Fabulina*, to which Von Bertin refers *T. australis*, Desh., and *T. margaritina*, Lamarck.

Lucinopsis pellucida, *spec. nov.* Plate xi., fig. 2.

The shell, the diagnostic characters of which here follows, has an external resemblance to *Kellia rotunda* and *Diplodonta globularis*, more especially to the latter by reason of the external ligament. But the internal characters are proper to *Lucinopsis*, as determined by actual comparison with its type-species, *L. undata*.

The left valve has three cardinal teeth; the central tooth is vertical, triangular, and its summit medially excavated, appearing as if bifid; the anterior tooth is lamellar, short, and moderately divergent; the posterior tooth is longer, lamellar, and widely divergent; the anterior cardinal margin has a deep and wide groove.

The right valve has two divergent lamellar teeth, and the cardinal margin in front is furrowed.

The pallial sinus is large, rounded, and ascending, reaching to the middle line of the valve.

Shell rather globose, somewhat circular, and nearly equilateral; it is whitish, slightly glossy, and translucent, ornamented with fine concentric lines and folds of growth, and with delicate radial striæ on the posterior area.

Dimensions.—Antero-posterior, 12·5; umbo-ventral, 12; sectional diameters. 7·5.

Dredged in life (two examples) from 12 fathoms in Yankalilla Bay, St. Vincent-Gulf (*Dr. Verco*).

Crassatella carnea, *spec. nov.* Plate xi., figs. 1, 1a.

Shell suborbicular, rather compressed, almost equilateral; the dorsal margin about equally sloping on both sides, a little arched in front, but rather straighter behind; anterior side rounded, post-ventral margin slightly obliquely truncated (more conspicuously so in young examples); ventral margin moderately curved.

Surface concentrically ribbed, the ribs attenuate laterally, and may or may not be developed to the ventral margin.

The colour is a pale yellow-brown with darker coloured blotches in the median area and before and behind the umbos; sometimes

there are two interrupted brownish-coloured rays bounding the median area.

The interior is rose-tinted and the inner edge of the valves along the ventral margin is minutely crenulated.

Dimensions.—Antero-posterior diameter, 22; anterior radius, 10·5; posterior radius, 11·5; dorso-ventral diameter, 19.

Habitat.—Dredged in life from nine to fifteen fathoms in Yankalilla Bay, and off Rapid Head by Dr. Verco.

This species is very like *C. aurora* and *C. Banksii*, Adams and Angas, inhabiting Bass-Straits, with regard to colour, ornament and crenated margin of valves. It is, however, of a different form, is as widely removed from *C. aurora* as that species is from *C. Banksii*; thus *C. Banksii* is oblong-ovate, *C. aurora*, transversely ovate, and *C. carnea* is more rotund; they may eventually prove to be variations in shape of an aggregate species.

The proportion of length to the height in *C. carnea* is 14 to 12, and in *C. aurora* it is 15 to 11.

Pectunculus sordidus, *spec. nov.* Plate xi., fig. 8.

Shell solid, triangularly ovate, moderately convex or slightly depressed, cardinal area short and narrow, somewhat angulated posteriorly, the post-dorsal region impressedly flattened and narrow.

Surface radiately ridged; ridges 20, broad, subangulated, not prominently elevated, separated by linear furrows; there are five faint ribs on the post-dorsal area; the whole surface crossed by close and fine concentric striæ.

Colour sordid-white, with a few minute chesnut spots about the umbones, and blotches of the same colour about the hinge-line. Interior white, with a faint chesnut-tinge about the post-adductor impression. Inner margin strongly crenated.

Dimensions.—Antero-posterior, 20; umbo-ventral, 18; sectional diameters, 10·5 mm.

Dredged in life (one example), from 9 to 11 fathoms, off Rapid Head, St. Vincent-Gulf (*Dr. Verco*).

It has not the shape of *P. Gealei* of the same size, but the general style of ornament is the same; though the ribs of the present shell are more depressed and angular, there is no defined interstitial furrow, and the concentric ornament is finer.

Leda Vercoms, *spec. nov.* Plate xi., fig. 4.

Shell elongate-ovate, moderately compressed, subequilateral; concentrically lirate; covered with a greenish-gray glossy epidermis.

The dorsal margins are equally sloping, the front one a little convex, the posterior slightly concave; the posterior side is

shortly acuminated; a slightly-curved keel defines the dorsal area, which is striated and moderately impressed; the lunule is very narrow and defined.

The concentric lirae are regular, about 30, stout, elevated, and compressedly-rounded, separated by a little wider, flat furrows; they are slightly incurved as they approach the anterior margin, and more conspicuously so towards the posterior keel, though there is no appearance of a second keel.

Dimensions.—Antero-posterior, 8; umbo-ventral, 5; sectional diameters, 3·5 mm.

Numerous examples dredged in life by Dr. Verco (after whom the species is named) in Yankalilla Bay; also in shell-sand, Holdfast Bay (*R. T.*).

This is not the young of *L. crassa*, which at the same size has a well-pronounced second keel defining the rostral area. It makes an approach to *L. Dohrni*, Hanley, but has not so straight a hinge-line, and is more convex.

A Second Supplement to a List of the Lamellibranch and Palliobranch Mollusca of South Australia.

By Professor Ralph Tate, F.L.S., F.G.S.

[Read September 8, 1891.]

Chiefly through the dredging operations conducted by Dr. Verco during the past summer several additions have been made to the Lamellibranch-fauna of South Australian waters; several of these are of extreme interest, and I am constrained to found no less than six new species, which are described in the preceding pages.

Addenda and corrigenda to previously recorded species are placed within brackets.

Thracia speciosa, *Angas*, Proc. Zool. Soc., 1869, t. 2, fig. 12, p. 48.

Compared with *T. modesta*, this species is oblong and more inequilateral.

A left valve, dredged at 12 fathoms in Yankalilla Bay by Dr. Verco, agrees fairly well with Angas' figure of his *T. speciosa*, though its anterior side is longer, and the height is slightly less. Length, 19·5 mm.; height, 10·5.

Hemimactra cretacea, *Angas.*

Ref.—Spisula cretacea, Angas, Proc. Zool. Soc., 1867, t. 44, fig. 6.

Closely resembles *Anapa triquetra*, but differs generically and particularly by the lateral teeth being striated.

Dead shells, Encounter Bay *(Adcock)* and Aldinga Bay *(Kimber)*. The identification is based on the comparison with authentic specimens from the locality of the type.

[**Lutraria oblonga,** *Gmelin.*

Mr. G. B. Sowerby in Journal of Conchology, October, 1889, p. 155, writes that "This species, under various names, seems to range from the west coast of Ireland eastward to the Philippine Islands, and southward to the Cape. It is taken for granted by most authors that those found in Australian and Indo-Pacific waters must be specifically distinct from the European, but I can find no reliable character by which to distinguish them."

After a careful study of numerous examples of our Lutrariæ and comparison with authentic specimens of *L. oblonga*, I concur with Mr. Sowerby's views, and express the opinion that one species only exists in our waters; therefore the names *L. rhynchæna* and *L. dissimilis* must be relegated to the long catalogue of synonyms under *L. oblonga*. Menke in Moll. Nov. Hollandiæ, p. 46, 1843, would seem to have been the first to identify an Australian Lutraria with the European species, as he records *L. solenoides*, Lamarck, (a recognized synonym of *L. oblonga*) from the west coast of Australia).]

Semele monilis, *Tate, antea*, p. 261.

Aldinga, Moonta, and Yankalilla Bays.

Tellina Vincentiana, *Tate, antea*, p. 262.

Off Rapid Head and Myoponga, and Yankalilla Bay in St. Vincent-Gulf.

[**Tellina modestina,** *Tate, nom. mut.*

Tellina modesta, Sowerby, 1883; non Carpenter *(Angulus modesta)*, Proc. Acad. Nat. Sc. Philadelphia, p. 56, 1865; *T. modesta* (Carp.), Bertin, Nouv. Arch. du Mus., 1878, p. 274.]

Lucinopsis pellucida, *Tate, antea*, p. 263.

Yankalilla Bay, St. Vincent-Gulf.

Chione striatissima, *Sowerby.*

Ref.—Venus striatissima, Sowerby, Thes. Conch., p. 718, t. 157, figs. 103-105; *id.*, Reeve, Conch. Icon., t. 26, f. 135, 1864; *Chione striatissima*, Deshayes.

This species, which is not uncommon in St. Vincent-Gulf and

Encounter Bay, ranging from 10 to 25 fathoms, and not rare as a beach-shell, has been incorrectly referred by me as the young of *C. gallinula*, whereas, at the time, I did not actually know juvenile states of that species.

[**Kellia rotunda**, *Deshayes.*

An examination of living examples proves the presence of a broad and short respiratory canal, proper to *Kellia*. Mr. Adcock reports to me that the species inhabits the interior of freshly-deserted egg-cases of sharks; often many examples, from the state of fry to that of the adult, occur, clinging by byssal threads to the surface of the egg-case. Woodward says that *Kelliæ* creep about freely, and fix themselves by a byssus at pleasure.]

[Genus Ephippodonta.

My description of the animal of *E. McDougalli* proves on examination of less distorted specimens (in spirit) to be incorrect. The mantle-lobes are united, except for a length of about one-third of the animal, at the anterior medial line. The mantle has, however, a narrow marginal reflection coincident with the shell-border; the marginal reflections of each lobe imbricate before and behind, they are papillary externally and shortly ciliate-fringed on the edge. The inner pair of gills are very large and tumidly swollen, they are united behind. The adductor muscles are in near proximity to the hinge-line.

Through the slit of the united mantle-lobes a pointed cylindrical foot and the thickened margins of the inner gills are partially protruded; or the latter, when concealed, produce large swellings of the mantle, these I mistook for a creeping disk.

These characters bring the genus in close relation to *Scintilla*.]

Crassatella carnea, *Tate, antea*, p. 263.

Yankalilla Bay and to north of Rapid Bay *(Dr. Verco)*.

Unio Novæ-Hollandiæ, *Gray.*

Ref.—Proc. Zool. Soc., 1834, p. 57.

Unio cucumoides, Lea, 1840, and Obs., vol. III., p. 30, t. 7, fig. 2, 1843; *id.* Reeve, Conch. Icon., 1868, t. 20, fig. 89.

A black, elongate, narrow, very plicate shell, attenuated and narrowly truncated posteriorly.

Length, 3½ inches; breadth, 1¼ inch.

Lagoon near Alice Springs (coll. Mr. Adcock).

The identification is based on Reeve's figure of *U. cucumoides*, though the specimen wants the diversely radiating wrinkled-warts on the posterior side, as described by Gray and Reeve. Smith positively affirms the identity of this species and *U. cucum-*

oides, and is therefore known from the Macquarie, Hunter, and Richmond Rivers.

[**Carditella subtrigona**, *Tate*.

Many living examples of this species were dredged by Dr. Verco in Yankalilla Bay. The shell is covered with a thin epidermis of a pale-horn colour, varied with a more or less diffused flesh-tint. The largest examples have the following dimensions :—Antero-posterior, 7·75; umbo-ventral, 7; and sectional diameters, 5.]

Cardita Gunni, *Deshayes*.

Proc. Zool. Soc., 1852, p. 101; *C. Atkinsoni*, Ten.-Woods.

A suborbicular cordate shell, with from 17 to 19 nodosely squamose ribs about as wide as the furrows. Long., 13; lat., 12 mm.

In deep water off Kangaroo Island; Yankalilla Bay; Encounter Bay; also Tasmania.

Leda Verconis, *Tate*, *antea*, p. 264.

Yankalilla Bay; Holdfast Bay.

Pectunculus sordidus, *Tate*, *antea*, p. 264.

Off Rapid Head, St. Vincent-Gulf.

[**Pectunculus Gealei**, *Angas*.

Proc. Zool. Soc., 1873. t. 20, fig. 5, p. 183.

P. flabellatus, Ten.-Woods, Trans. Roy. Soc., Vict., 1878, p. 61.

P. laticostatus, Angas, P.Z.S., 1878, p. 871.

P. orbicularis, Angas, P.Z.S., 1879, t. 35, fig. 9, p. 420.

P. Beddomei, E. A. Smith, Lamell. Challenger Ex., 1885, p. 255, t. 18, figs. 1-1*b*.

There is no doubt that *P. flabellatus* and *P. Beddomei* are the same, though Woods' diagnosis is not satisfactory; however, the excellent figure of *P. Gealei* (a New South Wales shell) permits one to refer, without hesitation, the species of Woods and Smith to it. *P. orbicularis*, described from a Bass-Straits shell, represents a young stage of the same species, which is remarkable for its long straight hinge-line.]

Modiola arborescens, *Chemnitz*.

Mytilus arborescens, Chemnitz, Conch. Cab., vol. 2, t. 198, f. 2016-17.

Modiola arborescens, Reeve, Con. Icon., t. 6, f. 30 (1857).

Modiola picta, Lamarck, An. S. Vert., vol. VI., p. 112 (1819); id. Sowerby, Genera of Shells, fig. 1.

A compressedly-convex cylindrically-oblong shell, white under a pale-yellow highly glossy epidermis, the posterior slope divaricately netted with fine purplish lines.

One valve dredged off Troubridge by Mr. E. H. Matthews; several living specimens and detached valves dredged at 14 to 17 fathoms in Yankalilla Bay by Dr. Verco. The largest example measures 30 mm. long by 12 mm. broad.

The habitat of the species was unknown to Lamarck, but he gives Atlantic Ocean with a doubt, Deshayes in 1836 simply repeats him. Reeve refers the species to the West Indies.

This beautiful mussel is, however, recorded by Tenison-Woods, Proc. Roy. Soc., Tasmania, as very rare in Long Bay, Tasmania, and of about 45 mm. long. The South Australian examples are much smaller, but otherwise are comparable with Reeve's figure. Mr. John Brazier writes me, "I dredged *Modiola arborescens* outside Sydney Heads, some 17 years ago, in 45 fathoms, also inside Port Jackson in 18 fathoms."

Terebratula Wyvillei, *Davidson.*

Ref.—Challenger Brach., t. 2, fig. 7-8; id. Trans. Lin. Soc., 1886, t. 2, f. 8-14.

Off South Australia, lat. 42° 42′, long. 134° 10′, depth 2,600 fathoms.

Also Chili, Patagonia, and Falkland Islands.

EXPLANATION TO PLATE XI.

Fig.
1-1a. Crassatella carnea. Slightly enlarged.
2. Lucinopis pellucida. 2 x.
3. Latirofusus nigrofuscus. 2 x.
4. Leda Verconis. 3 x.
5. Leiopyrga octona. 3 x.
6. Siphonalia oligostira. Nat. size.
7-7a. Semele monilis. Nat. size, and magnified portion.
8. Pectunculus sordidus. 2 x.
9. Diala magna. 3 x.
10. Tellina Vincentiana. 2 x.

A Bibliography and Revised List of the Described Echinoids of the Australian Eocene, with Descriptions of some New Species.

By Professor Ralph Tate, F.L.S., F.G.S., &c.

[Read October 6, 1891.]

I.—BIBLIOGRAPHY OF THE EOCENE ECHINOIDS OF AUSTRALIA.

1834. Sturt, "Two Expeditions in the Interior of Southern Australia," gives drawings of three Echinoids from the Eocene calciferous sandstone of the River Murray Cliffs, which can very safely be referred to familiar species known to occur there:—*Spatangus Hoffmanni*, Goldfuss, t. 3, f. 10, is *Lovenia Forbesi*: *Scutella*, sp., t. 3, f. 9, represents the underside of *Monostychia australis*; whilst the *Echinus*, t. 3, f. 11, is unrecognizable, but may be *Psammechinus Woodsi* or *Paradoxechus novus*, more probably the latter.

1862. Rev. J. E. Tenison-Woods, "Geological Observations in S. Aust.," copies the figures of Sturt's *Echinoids*, calling the *Spatangus S. Forbesii*, and adds two figures of an *Echinolampas* from Mount Gambier.

1864. Dr. Duncan, "Annals and Mag. Nat. Hist.," p. 165, figures *Hemipatagus Forbesi*, and records *Clypeaster folium*, Ag., but which is now recognised as *Monostychia australis*, Laube, and not the species of Agassiz.

1867. Rev. J. E. Tenison-Woods, "Trans. Adelaide Phil. Soc.,' illustrates:—*Echinolampas Gambierensis*, n. sp., figs. 1*a*-1*c*; *Hemipatagus Forbesi*, (Woods and Duncan), figs. 3*a*-3*d*; and *Hemiaster Archeri*, n. sp., figs. 2*a*-2*d*. The last is the *Echinolampas* figured in his "Geol. Observations."

1869. Dr. G. C. Laube, "Sitz. d. K. Akad. d. Wissenchaft. Wien," vol. LIX., p. 193, describes the following species from the River Murray Cliffs:—*Psammechinus Woodsi*, n. sp.; *Paradoxechinus novus*, n. sp.; *Monostychia australis*, n. sp.; *Catopygus elegans*, n. sp.; *Echinolampas ovulum*, n. sp.; *Micraster brevistella*, n. sp.; *Eupatagus Murrayensis*, n. sp.; *E. Wrighti*, n. sp.; and *Hemipatagus Forbesi*, Tenison-Woods. I have no hesitation in

referring the *Echinolampas* to *E. Gambierensis* and the *Micraster* to *M. Archeri*, T.-Woods *(Hemiaster)*.

1875. R. Etheridge, jun., "Quarterly Journal Geological Society," vol. XXXI., p. 444 *et seq.*, gives a list of the Tertiary Echinodermata of Australia, describes *Hemipatagus Woodsii*, n. sp., and illustrates some details of structure in respect of *Psammechinus Woodsii* and *Micraster brevistella* not shown in Laube's drawings.

1876. Prof. Duncan, "Quarterly Journal Geological Society," vol. XXXIII., describes *Leiocidaris australiæ*, *Temnechinus lineatus*, *Arachnoides Loveni*, *A. elongatus*, *Rhynchopygus dysasteroides*, *Echinobrissus australiæ*, *Holaster australiæ*, *Maretia anomala*, *Eupatagus rotundus*, *E. Laubei*, and *Megalaster compressus* as new species, *Megalaster* as a new genus. In addition there are "Supplementary Notes" on previously-described species, and the following exoteric species are recorded:—*Pygorhynchus Vassali*, Wright; *Schizaster ventricosus*, Gray; *Echinarchnius parma*, Gray; *Echinanthus testudinarius*, Gray.

1877. Prof. Tate, "Quarterly Journal Geological Society," vol. XXXIII., p. 257, fig. 2, describes *Salenia tertiaria*, n. sp., from Aldinga Cliffs, and records 15 genera additional to the echinodermal fauna of the Australian Tertiary.

1877. R. M. Johnston, "Proc. Roy. Soc., Tasmania," p. 116, records from the Eocene of Table Cape, Tasmania, *Micraster brevistella*, Laube, *Hemipatagus Woodsii*, Etheridge, and *Micraster Etheridgei*, n. sp. The author says of the last that the dorsal surface is very imperfectly preserved, but in his "Geol. of Tasmania," p. 231 (1888), it appears as *Monostychia Etheridgei*. It will serve no useful purpose to retain Mr. Johnston's species, as it is insufficiently diagnosed to permit of a safe generic interpretation, and the absence of a figure makes its attachment to known species a most hazardous venture.

1879. Prof. McCoy, "Prodromus Palæontology of Victoria," Decade VI., figures and describes *Lovenia Forbesi* and *Monostychia australis*.

1882. Prof. McCoy, "Prodr. Pal. Victoria," Dec. VII., figures three new species of *Pericosmus*, and believes that *Megalaster compressus* may be the same as his *P. compressus*, on which the fascioles have been obliterated.

1884. Prof. Tate, "Trans. Roy. Soc., S. Aust.," pp. 37 *et* 41, gives a list of the Echinodermata of the River Murray

Cliffs, and indicates the identity of *Echinolampas ovulum* and E. *Gambierensis*.

1885. Prof. Tate, "Southern Science Record," Janry., p. 4, describes *Fibularia gregata*, n. sp., and *Linthia antiaustralis*, n. sp.

1887, Prof. Duncan, "Quart. Journ. Geol. Soc.," vol. XLIII., p. 411 *et seq.*, gives a list of species of the Echinoidea of the Australian Tertiaries, which is essentially the same as his former one published in 1877, as the only additional species admitted are *Salenia tertiaria* and McCoy's three species of *Pericosmus*. However, a revision is made of the specific characters of some species; a new genus *Ortholophus* is erected for his *Temnechinus lineatus; Rhynchopygus dyasteroides* is altered to *Holaster difficilis;* but *Megalaster* is retained, as is also *Clypeaster folium*, Ag., but as a variety; of living species *Echinarchinus parma* is dropped out, but *Schizaster ventricosus* is retained on an imperfect specimen.

1888. Prof. Tate, "Proc. Roy. Soc., New South Wales," p. 240 et seq., gives a list of genera of Echinoids, and the number of species to each from the Older Tertiary of Australia, amounting to 29 genera and 49 species. The following emendations have arisen:—*Temnechinus* includes *Paradoxechinus* and *Ortholophus; Murravechinus* (n. gen.) is a *Cœlopleurus; Arachnoides* is *Monostychia*, but the genus *Arachnoides* will stand, as a species has since been found in the Miocene at the Gippsland Lakes; *Cardiaster* is to be added, though inadvertently omitted, it was included in his list of 1877; *Rhynchopygus* should be expunged.

1889. Prof. Duncan, "Journ. Linnean Society, London," in a revision of the Genera of the Echinoidea, makes special reference to a few of our Tertiary species; but persists in the retention of his genus *Megalaster*.

1890. A. C. Gregory, "Geological Magazine," has anticipated me by describing several new species, some belonging to genera not hitherto known to form part of the Echinodermal fauna of the Australian Tertiary, except through their introduction in my lists of genera published in 1877 and 1888; *e.g.*, *Hemiaster*, *Cardiaster*, and *Cassidulus*. All of them have been distributed to various public museums with M.S. names, which are added as synonyms in the appended "List of Described Species" for the information of those to whom they have been sent.

Table of Genera, showing their Geological Range.

The Echinoids of the Eocene of Australia belong to the following 28 genera, the geological range of which is indicated. From an analysis of their distribution in time, it may safely be concluded that this Echinoid fauna is Eocene, rendered more pronounced by the survival of a few Cretaceous genera. The sign * denotes that the genus is restricted to the Australian region for the geologic age indicated.

	Trias.	Jurassic.	Cretaceous.	Eocene.	Miocene.	Recent.
Cidaris ...	x	x	x	x†	x	x
Salenia ...	.	.	x	x	.	x
Cœlopleurus	.	.	.	x	x	x
Paradoxechinus	.	.	.	*	.	.
Orthologhus	.	.	.	*	.	.
Psammechinus	.	.	x	x†	x	x
Scutellina	.	.	.	x	.	.
Fibularia	.	.	.	x	x	x
Clypeaster	.	.	.	x	x	x
Monostychia	.	.	.	*†	.	.
Laganum	.	.	.	x	x	x
Echinobrissus	.	x	x	x†	.	.
Cassidulus	.	.	x	x	.	.
Pygorhynchus	.	.	x	x	x	.
Studeria	.	.	.	x	.	x
Echinolampas	.	.	.	x†	x	x
Holaster	.	.	x	*†	.	.
Cardiaster	.	.	x	*†	.	.
Hemiaster	.	.	x	x	x	x
Pericosmus	.	.	?	x†	.	.
Linthia ...	.	.	x	x	?	x
Schizaster	.	.	.	x†	x	x
Micraster	.	.	x	x†	.	.
Brissus ...	.	.	.	x	x	x
Toxobrissus	.	.	.	x	x	.
Maretia	.	.	.	x	x	x
Eupatagus	.	.	.	x†	x	x
Lovenia ...	.	.	.	x†	x	x

The number of described species admitted is 35; but the collection in the University Museum contains about 20 species of recorded genera which yet remain undiagnosed. In the following catalogue of described species the locality-names printed in capitals are those yielding the type-examples. The list of localities is very incomplete, as I have not consulted with my various correspondents, and those additional to the original ones are supplied from my own personal knowledge.

† Also in New Zealand.

II.—LIST OF DESCRIBED SPECIES.

FAMILY CIDARIDÆ.

Genus Cidaris, *Leske*, 1778.

Subgenus Leiocidaris, *Desor*.

1. Leiocidaris australiæ, Duncan, Q. J. G. S. vol. XXXIII., p. 45, t. 3, f. 1, 2, 1877.

Localities.—Cape Otway, Aldinga Cliffs, R. Murray Cliffs, and generally in all fossiliferous strata of Eocene age.

FAMILY SALENIIDÆ.

Genus Salenia, *Gray*, 1835.

2. Salenia tertiaria, Tate, Q. J. G. S. vol. XXXIII., p. 256, figs. 2*a*-2*c*, 1877; *id*, Duncan, Ann. and Mag. Nat. Hist., 1878, vol. II., p. 61; A. Agassiz, Challenger Echini, p. 51 (1881).

Localities.—Aldinga Cliffs; Wilson Bluff, Gt. Aust. Bight.

3. Salenia globosa, Tate, see post.

Locality.—Aldinga Cliffs.

FAMILY ARBACIDÆ.

Genus Cœlopleurus, *Agassiz*, 1840.

4. Cœlopleurus pauciturberculatus, Gregory, Geol. Mag., 1890, p. 486, t. 14, figs. 4-5. *Murravechinus spinosus*, Tate, ms.

Locality.—River Murray Cliffs, near Blanchetown.

FAMILY TEMNOPLEURIDÆ.

Genus Paradoxechinus, *Laube*, 1869.

5. Paradoxechinus novus, Laube, Akad. d. Wissensch. Wien, 1869, figs. 2-23.

Localities.—R. Murray Cliffs at Mannum; Aldinga Cliffs.

Genus Orthologhus, *Duncan*, 1887.

6. Orthologhus lineatus, Duncan, Q. J. G. S., vol. XLIII., p. 415, 1887. *Temnechinus lineatus*, Duncan, Q. J. G. S., vol. XXXIII., p. 46, t. 3, figs. 3-5.

Locality.—Mordialloc.

FAMILY ECHINIDÆ.

Genus Echinus, *Linnæus*.

Subgenus Psammechinus, *Agassiz*, 1846.

7. Psammechinus Woodsi, Laube, Akad. d. Wiss. Wien, 1869, figs. 1-1*b*; *id*, Etheridge, Q. J. G. S., vol. XXXI., t. 21, fig. 10, 1875; Duncan, Q. J. G. S., vol. XXXIII., p. 64.

Localities.—River Murray Cliffs, *(Laube, R. T.)*, Aldinga Cliffs.

FAMILY FIBULARIIDÆ.

GENUS FIBULARIA, *Lamarck*, 1816.

8. FIBULARIA GREGATA, Tate, Southern Science Record, January, 1885, p. 4.

Localities.—Eocene, RIVER MURRAY CLIFFS at Mannum; Aldinga Cliffs; Surveyors' Point and Muloowurtie, Yorke-Peninsula; banks of the River Bremer, below Callington. All in South Australia.

GENUS SCUTELLINA, *Agassiz*, 1841.

9. SCUTELLINA PATELLA, Tate, see post.

Localities.—RIVER MURRAY CLIFFS; Mount Gambier; Muddy Creek.

FAMILY CLYPEASTRIDÆ.

GENUS CLYPEASTER, *Lamarck*, 1816.

10. CLYPEASTER GIPPSLANDICUS, McCoy, Prod. Pal. Victoria, Dec. VI., 1879 t. 49. *Echinanthus testudinarius* (Gray), Duncan, Q. J. G. S., vol. XXXIII., p. 46, 1877.

Localities.—MITCHELL RIVER, near Bairnsdale *(McCoy, R. T.*, &c.); River Murray Cliffs *(R.T.)*; Spring Creek, near Geelong, *(R. T.)*; Corio Bay; Muddy Creek; Mordialloc *(McCoy, R. T.*, &c.),

GENUS MONOSTYCHIA, *Laube*, 1869.

11. MONOSTYCHIA AUSTRALIS, Laube, Akad. d. Wiss. Wien., 1869, p. 190, figs. 3-3c. *Clypeaster folium* (Agassiz), Duncan, 1864. *Arachnoides australis*, Duncan, Q. J. G. S., 1877, p. 48. *Monostychia australis*, McCoy, Prod. Pal. Victoria, Dec. VI., 1879, t. 50, figs. 5-7. *Clypeaster (Monostychia) australis*, Duncan, Q. J. G. S., 1877, p. 420. Varieties, *Arachnoides Loveni*, Duncan, Q. J. G. S., 1877, p. 47, t. 3, figs. 6-7; *Arachnoides elongatus*, Duncan, *id.*, p. 48, t. 3, fig. 8.

Localities.—RIVER MURRAY CLIFFS, *(Laube, McCoy, R. T.*, &c.); Mount Gambier limestone *(T. Woods)*; Mordialloc *(Duncan, McCoy.)*

FAMILY CASSIDULIDÆ.

GENUS CASSIDULUS, *Lamarck*, 1801.

12. CASSIDULUS LONGIANUS, Gregory, Geol. Mag. 1890, p. 482, t. 13, figs. 1-3. *Cassidulus australis*, Tate ms.

Localities.—In the glauconitic limestone, ALDINGA CLIFFS; limestone, Roll's Point, Kingscote, Kangaroo Island.

GENUS PYGORHYNCHUS, *Agassiz*, 1839.

13. PYGORHYNCHUS VASSALI, Wright, Q. J. G. S. vol. XX., t. 22, figs. 6*a*-6*c* (1864); Duncan *id.*, vol. XXXIII., p. 51.

Localities.—East of the GLENELG RIVER; Mannum, River Murray.

GENUS CATOPYGUS, *Agassiz*, 1836.

SUBGENUS STUDERIA, *Duncan*, 1889.

14. CATOPYGUS (Studeria) ELEGANS, Laube. *C. elegans*, Laube, Akad. d. Wiss. Wien., 1869, figs. 8-8*c*., p. 10.

Locality.—RIVER MURRAY CLIFFS at Mannum.

GENUS ECHINOLAMPAS, *Gray*, 1825.

15. ECHINOLAMPAS GAMBIERENSIS, Tenison-Woods, Proc. Adelaide Phil. Soc., 1867, figs. 1*a*-1*c*; Tate, Trans. Roy. Soc., South Australia, 1884, p. 37. *Echinolampas ovulum*, Laube, Akad. d. Wiss. Wien., 1869, p. 191; Duncan Q. J. G. S., vol. XXXIII., p. 66, 1877; vol. XLIII., p. 420; Gregory, Geol. Mag., 1890, t. 13, figs. 7-8, p. 483.

Localities.—River Murray Cliffs *(Sturt, Laube, R. T.)*; MOUNT GAMBIER LIMESTONE *(T. Woods)*; Mitchell River, Bairnsdale *(Gregory)*.

16. ECHINOLAMPAS POSTEROCRASSUS, Gregory, Geol. Mag., 1890, t. 13, figs. 4-6, p. 483. *E. Gambierensis*, pars. Tate ms.

Locality.—Glauconitic limestone, ALDINGA CLIFFS.

GENUS ECHINOBRISSUS, *Breyn.*, 1732.

17. ECHINOBRISSUS AUSTRALIÆ, Duncan, Q. J. G. S., vol. XXXIII., pp. 50, 66, t. 3, fig. 11, 1877.

Locality.—CAPE OTWAY.

18. ECHINOBRISSUS VINCENTINUS, Tate, see post.

Localities.—ALDINGA BAY and near Ardrossan.

FAMILY ANANCHYTIDÆ.

GENUS HOLASTER, *Agassiz*, 1840.

19. HOLASTER AUSTRALIÆ, Duncan, Q. J. G. S., vol. XXXIII., p. 51, t. 3, figs. 12, 13, 1877; *id*, Q. J. G. S., 1887, p. 420, wdct. *Rhynchopygus dysasteroides*, Duncan, Q. J. G. S., 1877, p. 49, t. 3, figs. 9-10. *Holaster difficilis*, Duncan, Q. J. G. S., vol. XLIII., 1887, p. 421.

Localities.—Castle Cove, CAPE OTWAY; River Murray Cliffs; mouth of the R. Onkaparinga; Mount Gambier; west side of St. Vincent-Gulf.

Specimens comparable with Duncan's figures, obtained from a soft polyzoal limestone at the mouth of the Onkaparinga, have a fairly well-defined suranal fasciole. The species is very variable in shape, some examples are more depressed than the type, whilst in the opposite direction others are moderately elevated like *H. Trecensis*, Leymerie; and a few examples are subconic with a proportion of the long diameter to the height of three to two.

Duncan admits that *Rhynchopygus dysasteroides* is a crushed *Holaster*, and it would have been well if he had added—and

probably of *H. australiæ*, with some specimens of which it agrees in outline.

GENUS CARDIASTER, *Forbes*, 1852.

20. CARDIASTER TERTIARIUS, *Gregory*, Geol. Mag., 1890, t. 14, figs. 2-3, p. 484.

Locality.—Glauconitic limestone, ALDINGA CLIFFS.

The good state of preservation of many of my specimens permits me to state that there is no lateral fasciole.

21. CARDIASTER LATECORDATUS, Tate, see post.

Locality.—Glauconitic limestone, Aldinga Cliffs.

FAMILY SPATANGIDÆ.

GENUS HEMIASTER, *Desor.*, 1857.

22. HEMIASTER PLANEDECLIVIS, Gregory, Geol. Mag. 1890, t. 14, figs. 6-7, p. 488. *H. latifrons*, Tate, ms.

Localities.—RIVER MURRAY CLIFFS; glauconitic limestone; Aldinga Cliffs.

GENUS PERICOSMUS, *Agassiz*, 1847.

23. PERICOSMUS COMPRESSUS, McCoy, Prod. Pal. Victoria, Dec. VII., 1882, t. 67, f. 2, t. 68. *Megalaster compressus*, Duncan, Q. J. G. S., 1877, p. 62, wdct. *Pericosmus McCoyi*, Gregory, Geol. Mag., 1890, p. 485. *Megalaster compressus*, Duncan, P. L. S., 1889, p. 221.

Localities.—RIVER MURRAY CLIFFS *(Duncan, Tate)*; Spring Creek, near Geelong *(McCoy, R. T.)*.

24. PERICOSMUS GIGAS, McCoy, Prod. Pal. Victoria, Dec. VII., tabs. 64, 65.

Localities.—BANKS OF THE MURRAY, near junction with the Darling, and at Corio Bay, Port Phillip *(McCoy)*.

25. PERICOSMUS NELSONI, McCoy, Prod. Pal. Victoria, Dec. VII., t. 66, figs. 1-2, t. 67, fig. 1.

Locality.—WAURN PONDS, near Geelong.

GENUS LINTHIA, *Merian*, 1853.

26. LINTHIA ANTI-AUSTRALIS, Tate, Southern Science Record, January 1885.

Locality.—RIVER MURRAY CLIFFS, near Morgan.

GENUS SCHIZASTER, *Agassiz*, 1847.

27. SCHIZASTER ABDUCTUS, Tate, see post.

S. ventricosus (Agassiz), Duncan, Q. J. G. S., 1877, p. 61.

Localities.—RIVER MURRAY CLIFFS; Moorabool River, a cast (Mr. Sweet).

GENUS MICRASTER, *Agassiz*, 1840.

28. MICRASTER ARCHERI, Tenison Woods sp. *Echinolampas* sp. Tenison Woods, Geol. Obs., p. 77, wdcts., 1862. *Hemiaster*

Archeri, Tenison Woods, Proc. Phil. Soc., Adelaide, 1887, figs. 2*a*-2*d*. *Micraster brevistella*, Laube, Akad. d. Wiss. Wien., 1867, p. 192, fig. 8; Etheridge, Q. J. G. S., vol. XXI., p. 447, figs. 11, 12, 1875.

This species has an ill-defined fasciole truncating the posterior ambulacra, and extending nearly to the anterior pair, and thus makes a passage to *Brissopsis*; on this account I quoted it as *Brissopsis Archeri*, in Trans. Roy. Soc., 1884, p. 41.

Localities.—River Murray Cliffs; Mount Gambier *(Ten. Woods)*; Table Cape *(Johnston)*.

Genus Maretia, *Gray*, 1855.

29. Maretia anomala, Duncan, Q. J. G. S., vol. XXXIII., p. 52, t. 4, figs. 1-4, 1877.

Locality.—Mouth of the Sherbrook River, Victoria.

Genus Eupatagus, *Agassiz*, 1847.

30. Eupatagus Wrighti, Laube, Akad. d. Wiss., Wien, p 195, fig. 13, 1867.

Locality.—River Murray Cliffs (*Laube, R. T.*).

31. Eupatagus Murrayensis, Laube, *op. cit.*, p. 196, fig. 4, 1867.

Locality.—River Murray Cliffs (*Laube, R. T.*).

32. Eupatagus rotundus, Duncan, Q. J. G. S., vol. XXXIII., p. 53, t. 3, figs. 14-17.

Locality.—River Murray Cliffs (*Laube, R. T.*).

33. Eupatagus Laubei, Duncan, *op. cit.*, p. 55, t. 3, fig. 18.

Locality.—Mouth of the Sherbrook River, Victoria.

34. Eupatagus decipiens, Tate, see post.

Pericosmus compressus, Gregory, Geol. Mag., 1890, t. 14, fig. 1.

Localities.—In a polyzoal rock at the Mouth of the River Onkaparinga; and in a calciferous sandstone, Aldinga Cliffs, south side of Port Willunga Jetty.

Genus Lovenia, *Agassiz* and *Desor*, 1847.

35. Lovenia Forbesi, Tenison-Woods. *Spatangus Hofmanni*, Sturt (non Goldfuss), Two Exped., 1834, t. 3, fig. 10. *Spatangus Forbesi*, Tenison-Woods, Geol. Observ., 1862, p. 75, wdct. *Hemipatagus Forbesi*, Duncan, Ann. Mag. Nat. His., 1864, t. 6, figs. 3*e-f*; Laube, Akad. d. Wiss., Wien, 1867, p. 193, figs. 4-4*b*. *Hemipatagus Woodsi*, Etheridge, Q. J. G. S., 1875, t. 21, figs. 1-7. *Lovenia Forbesi*, Duncan, Q. J. G. S., 1877, p. 56, t. 4, figs. 5-8; McCoy, Prod. Pal. Victoria, Dec. VI., t. 60, fig. 1-4, 1879.

Localities.—Generally distributed; in polyzoal limestone- and calciferous sandstone- formations of Eocene age, in South Australia, Victoria, and Tasmania.

III.—DESCRIPTIONS OF NEW SPECIES.

Salenia globosa, *spec. nov.*

Test circular in outline, subglobose; apical system relatively small, hemispheric; vent excentric, irregularly pentagonal. Interambulacral tubercles large, seven in each vertical row; interambulacral zones comparatively wide, each at the ambitus about four times as wide as the ambulacrum in the same region.

Ambulacral zones with two outer rows of small secondary tubercles, between which are four oblique rows of smaller tubercles and some scattered granules. Pores in pairs, oblique; one pair to each ambulacral plate.

Peristome, smaller in extent than the apical system, with very shallow incisions.

Dimensions.—Height, 13·5; width, 18 mm.

Locality.—Glauconitic limestone, Aldinga Cliffs (2 exs.)

This second species of *Salenia* from our Tertiary is separable from *S. tertiaria* by its globose form and by having seven, in place of six, primary tubercles in each interambulacral row. Of the very many specimens of *S. tertiaria* which I have had under observation, I find no tendency to become conoid; it is, moreover, a much larger shell, the corresponding measures for *S. tertiaria* being 8·5 and 14, and 8 and 17·5. In shape this new species is exceedingly like the Cretaceous *S. gibba*, Agassiz, but is distinguished from it, among other characters, by having one pair of pores to each ambulacral plate, a character possessed by all Tertiary and the Recent species.

Scutellina patella, *spec. nov.*

Test large for the genus; subcircular to subdecagonal in outline; regularly conic.

Base regularly deeply-concave, the ambital margin tumid and narrowly defined abactinally.

Peristome central, nearly circular; moderately large; periproct supra-marginal, circular, very small as compared with the peristome.

Genital pores four; poriferous zones concealed beneath the ornament.

Interior with well-developed vertical partitions radiating towards the peristome.

Tubercles uniform, small, and perforate, rather wide apart, surrounded by scrobiculate ornament.

Dimensions of two examples:—Longitudinal diameter, 24, 22; transverse diameter, 22·5, 21; height, 7·5, 6.

Localities.—Calciferous sandstones of the River Murray Cliffs (common); white polyzoal limestone at Mount Gambier; polyzoal sands, Muddy Creek.

By its supra-marginal periproct this new *Scutellina* is related to *S. supera*, Agassiz; but its circular outline and high summit distinguish it; it is, moreover, very much larger

Echinobrissus Vincentinus, *spec. nov.*

Subconvex; ambitus ovate-subpentagonal, anteriorly rounded, sides arched to near the posterior border, which is roundly biangulated; base longitudinally concave, tumid mediolaterally. The anal sulcus is moderately deep, wide, rounded behind, and extends to more than half or nearly two-thirds the length of the post-apical radius. The apical disc is at about three-fifths of the long diameter from the front. The greatest width is in a plane intersecting the anal sulcus at its middle. The tuberculation is rather large, and largest on the actinal surface. There are no pores below the subpetaloid parts of the ambulacra, but pores in a single series occupy the ambulacra converging on the peristone.

Dimensions.—Longitudinal, 28·5; transverse, 23·; sectional diameters, 12· mm.

Localities. - Common in the glauconitic limestones, Aldinga Bay; also at Muloowurtie, near Ardrossan, York-Peninsula.

This species has the same general outline of *E. Morrisi*, Forbes, but is more depressed and has a very much wider sulcus, not narrow and acute behind. Another Cretaceous species which comes near to it, is *E. lacunosus*, Goldfuss, Petref. Germ., p. 141, t. 73, fig. 8, but it is more narrowed at the front, more angulated behind, the anal sulcus is much longer, and the apical system is more excentric. *E. Australiæ*, Duncan, has an elliptical outline.

Cardiaster latecordatus, *spec. nov.*

Test orbicular-cordate, as seen from above, with a deep and wide anterior groove, which is tumidly keeled at its sides, and extends from the vertex to the peristome; the base is slightly concave longitudinally, and flattened laterally; the ambitus is slightly tumid, and the abactinal surface is depressedly convex.

The apical system is excentric, and is a little posterior to the vertex.

From the vertex the surface slopes rapidly in all directions, most so to the posterior margin, which is slightly rostrated truncate; the posterior face is wide, but short, and is slightly concave vertically. The posterior slope is interrupted by a faint keel; and the anterior by the tumid keels bordering the anterior groove, transverse to which the anterior lateral areas are slightly concave. The anterior groove is very wide, but contracts a little at the ambitus, where it is deepest.

The ambulacra are flush, the anterior ambulacra slightly arched, are more prominent, the poriferous zones in each of the posterior ambulacra diverging more rapidly than those of the

anterior pair. The interstitial ridges between the conjoined pores of the paired ambulacra are minutely granulated.

The test is minutely granular, and thickly studded with minute tubercles, which become conspicuous on the anterior interambulacra, more especially on the keels of the anterior groove.

Dimensions.—Longitudinal diameter, 82; transverse diameter at 30 mm. from the front, 87; height, 35 mm.; width of groove at ambitus, 11; in a medial position, 16 mm.

Locality.—Glauconitic limestone, Aldinga Cliffs (one ex.).

The conic abactinal surface distinguishes *C. latecordatus* from other depressed species of the genus, whilst its broadly cordate outline and large anterior groove are equally prominent characters.

Schizaster abductus, *spec. nov.*

Synonyms.—? *Schizaster ventricosus*, Duncan, Q. J. G. S., 1877, p. 61; *id*, 1887 (*non* Gray). ? *Schizaster exoletus*, Hutton, Cat. Tert. Echinod., New Zealand, 1873, p. 43.

Somewhat like *S. ventricosus*, but is proportionately broader and more depressed, has less-tumid sides, the posterior-median keel is less pronounced, and the outline is not so angular posteriorly. The dorsal slope rises regularly from before backwards, culminating in the posterior extremity of the projecting post-median keel, whilst the subanal area is broad and concavely depressed; characters so strikingly different from *S. ventricosus* as not to permit a confusion of the two species. The anterior petals are in broader and shallower grooves, which are less-arched at the apex, so that they are markedly divergent from the odd ambulacrum; whilst in *S. ventricosus* they are nearly parallel. The posterior petals are also less divergent than in *S. ventricosus*, and the odd ambulacrum is in a narrower and shallower furrow, which only slightly indents the ambitus. The vertex is, moreover, less excentric.

Comparative dimensions of the two species in millimetres:—

	Length.	Breadth.	Height.
S. ventricosus ...	42	35	33
S. abductus ...	58	55	34

Localities.—In the Eocene calciferous sandstone of the River Murray Cliffs, near Morgan (two perfect exs.); Moorabool River, near Geelong (Mr. Sweet, a cast).

Professor Duncan, *op. cit.*, has determined "a large specimen partly in the form of a cast from the Adelaide-district" to belong to the living *S. ventricosus*, but I am disposed to regard it as the present species which is the only one of the genus as yet found in the Australian Tertiary. Under these circumstances it would be unsafe to admit Prof. Duncan's identification on such imperfect material, and the name should be expunged from our

list. The same author rejects *S. ventricosus* as Australian, whereas Gray's type is from West Australia, and the species is known from Southern Australian waters.

Professor Hutton, *op. cit.*, describes a *Schizaster* from the Oamaru formation under the name of *S. exoletus*. The type-specimen is before me, it is an imperfect cast, apparently of a *Schizaster*, and may be identical with the species from the River Murray Cliffs. The uncertainty of the identification makes it desirable to attach a different name to our fossil.

Eupatagus decipiens, *spec. nov.*

Synonyms.—Pericosmus compressus, Gregory, Geol. Mag., 1890, t. 14, fig. 1, p. 485 (non *Megalaster compressus*, Duncan; non *Pericosmus compressus*, McCoy).

There cannot be a doubt that *Megalaster* was founded on a *Pericosmus* of which the fascioles had been obliterated, this is not an unusual circumstance with specimens of *P. compressus* obtained from the raggy limestones at Mannum, on the River Murray, whilst, on the other hand, specimens of the same species from the soft calciferous sandstone near Blanchetown, 60 miles higher up the river, have the characteristic fascioles of the genus, well-displayed, such as are illustrated by McCoy in his figures of the species. *P. compressus*, McCoy, and *Megalaster compressus*, Duncan, are certainly the same species. Gregory considers, however, the two to be distinct, and refers to Duncan's species a fossil from the Aldinga Cliffs, whilst the Murravian species he calls *P. McCoyi*. He has, however, overlooked the fact that Duncan's type came from the Murray Cliffs. In other words, *Pericosmus compressus* of Gregory does not represent the Murravian fossil; indeed, it is generically different, being a *Eupatagus*. I have been long familiar with the species, which is represented in the University Museum by numerous well-preserved examples, and propose for it the name as cited above.

The presence of tubercles on the abactinal surface, though small for the genus, is alone sufficient to afford a clue to its right generic location. The excellent drawing and comparative characters given by Mr. Gregory make it unnecessary to furnish a formal diagnosis of the species. Its shape and the paucity and smallness of the abactinal tubercles afford the leading distinguishing characters of this large species of *Eupatagus*.

Further Notes on the Habits and Anatomy of Notoryctes typhlops.

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[Read October 6, 1891.]

Plate XII.

Mr. Bishop, of the Idracowra Station, to whom I have expressed myself indebted for many interesting facts concerning the habits of *Notoryctes typhlops*, has been good enough to supply me with further information on the subject since the date of our meeting in Central Australia in June, 1891.

It may be remembered that in my previous communication to this Society (vol. XIV., pt. 1) I mentioned that, up to the time of its publication, it had not been found possible in any case to keep a living specimen in captivity for more than a very short time. Shortly after our overland party had passed through the Idracowra country, however, Mr. Bishop was able, by careful management, to keep one alive and in good health for several weeks—indeed, so successful was he in meeting its requirements, that he expressed himself confident of being able to bring a living specimen to Adelaide. This, however, was unfortunately not to be, for in spite of all the care devoted to it, the little animal died before its owner could make his intended visit southwards. Nevertheless, the comparatively lengthened period of its captivity gave excellent opportunities for some careful observations, which are now recorded here.

From the contents of Mr. Bishop's letters to me, I compile the following statement by way of supplement to the particulars given in the paper referred to :—

Having had a living specimen brought to him on the 15th June, he kept it in a box of sand, in which was placed a tussock of porcupine grass *(Triodia irritans)*, so as to imitate its natural surroundings as nearly as possible. At the same time precautions against exposure to cold were taken by covering up the box with blankets, and the sand in the box was frequently changed, the fresh supply being first warmed and moistened. It was fed on the "witchety" previously referred to, two or three small

grubs or a single large one being given daily. These it ate with such evident eagerness and avidity as to suggest that the animal was accustomed to that kind of food. Occasionally it was offered beetles of a species that is found under the porcupine clumps, but though these disappeared from the box, it is not certain that they were actually eaten. Ants, also, were tried with a previous specimen, but it seemed as if it was the *Notorycles* which ran the risk of being eaten. Strong support is afforded to the suggestion that the "witchety" forms a part, at least, of its diet by the fact that, as previously observed, acacias are plentiful in the sandhills, which seem to be the natural haunt of the animal, and the larvæ in question are found in their roots at a depth of a foot or more. The suggestion is also confirmed by the statements of the natives and by the observations of Mr. Bishop himself, who found traces of underground burrowings around the stems of the acacia bushes. Still, it is not clear how the "witcheties," which are buried in the wood, are dislodged.

The aborigines declare that in the cold weather "oor-quámata no more walk about," and that they like damp sand, which confirms the statement previously made that they can only be found in warm weather after rain. Nevertheless, on one occasion two living specimens were placed, with the usual precautions, in a box containing two feet of damp sand, but they were found dead after the succeeding frosty night, though the box was well protected; the result being, in Mr. Bishop's opinion, due to the fact that there was not a sufficient depth of sand to enable them to get out of range of the effect of the frost, and he thus believes that in their wild state they must burrow to a considerable depth. With a winter experience of the climate in question, I do not think the frost, though undoubtedly sharp at times, could ever penetrate far below the surface of the ground.

When inspected in the box the oor-quámata would usually be found lying curled up in the sand, but not covered by it; and when the hand was put down immediately in front the little animal would climb into it and "claw it all over." It seemed quick of hearing, and always awakened immediately on lifting the lid of the box. A very slight whistling noise was sometimes made while the specimen, kept so long in captivity, was burrowing about in the box; but it was not certain whether this was a respiratory or a true voice sound; and a previous specimen was heard, when held, to make a faint chirping like that of a newly-hatched chick. None of the other specimens, however, emitted any sound that was audible.

Whenever the sand was changed by a fresh, warm, and moist supply the animal immediately commenced to burrow, and on warm sunny days, when it was let out in the open, it would, if the

sand were hard, run a little way fairly quickly; but wherever the surface was soft it would begin burrowing directly, and, as soon as it had got a fair start, it progressed with great rapidity, though not so quickly as is suggested by a statement recorded in my previous paper.

I had specially commissioned Mr. Bishop to make all possible endeavor to secure a female with young, or at least to ascertain from the natives something about its breeding habits, but in spite of strenuous efforts he has not been able to acquire any information on the subject. Indeed none of the natives questioned had ever seen the young.

Incidentally it is mentioned that the depth of coloring and the darker markings about the hind quarters vary somewhat in different individuals, a fact which is confirmed by the examples received. I may further state that, in one or two of the more recent specimens, the lustre of the fur, especially about the belly and the rump, is so bright and so beautifully variable in tint, according to the incidence of light, as to invite the use of the term iridescent. The blacks also state that larger specimens than those found at Idracowra are met with further up the Finke watercourse.

I have received also a rough sketch of the tracks made by it in the sand, which conforms to the description already given.

In spite of the hopes, raised by this account of Mr. Bishop's successful management, that he would be able to bring this living specimen to Adelaide, we have been doomed to disappointment, for a letter received last month conveyed the disappointing news of its death. Having been uninterruptedly well during its captivity, it was found torpid and evidently ailing one morning after a heavy gale; it remained in this condition and died on the following day, after having endured a confinement lasting from the 15th June to 28th August, or a little over ten weeks. The animal seemed to maintain its condition throughout, and the only change in it observable was a decided increase in the length of the claws, which seemed to grow from disuse. This made its later movements more awkward than at first.

I may add, with regret, that Mr. Bishop anticipated that the prevailing dry weather would prevent his being able to repeat his experiment before the date of his leaving Idracowra, about the end of October. I must again express my indebtedness to him for so many interesting and very carefully recorded facts.

The following observations were made from a specimen, 12·75 cm. long, that had been preserved in glycerine and spirit. An incision had been made through the walls of the abdomen to allow

the entrance of the preservative fluid, but the viscera were not in a good condition for examination, either microscopic or macroscopic.

Female Organs of Reproduction.

Marsupium.—In my previous description of *Notoryctes* I reported that an examination of the specimens obtained on my transcontinental journey enabled me to establish the fact of the existence of a pouch in the female, thus confirming statements which had been made by my local informants, and verifying the somewhat uncertain conclusion to which the examination of the first imperfect specimen had led. A more careful investigation of the organ enables me now to supplement my previous remarks with additional particulars. As stated, the furthest anterior limit of the fundus of the pouch, which opens backwards, and readily admits a rod 5 mm. in diameter, is 15 mm. in front of the cloacal orifice, but its true depth, *i.e.*, the extent covered by the ventral wall, is 8 mm. Long sparse reddish hairs cover the greater part of the interior, with which are interspersed numerous grains of red sand, and from its mouth a shallow groove, as already mentioned, leads backwards to the cloacal aperture. The fundus is not, however, a simple rounded *cul-de-sac*, but extends laterally into two shallow bays or recesses, in each of which lies a bundle of stiff almost bristle-like hairs; these were either lying completely loose, or were so feebly attached that they came away on the slightest touch of the forceps. On the dorsal wall of the pouch, at the entrance of each of these small bays or recesses, and 2 mm. from its blind extremity, is a very slightly elevated oval, or nearly circular, mammary prominence, having a diameter of from 1 mm. to 1·5 mm., its surface being devoid of hair. A distance of 2 mm. separates these two mammæ. They are so small as to be scarcely visible without a hand lens, and only come into view when the pouch is completely laid open. Rising from a slight depression in the centre of the prominence is an exceedingly minute nipple-like projection, which, however, scarcely reaches beyond the general level of the surface of the mamma. The arrangement may be likened to that of a circumvallate papilla, with a shallow sulcus, or to a retracted human nipple in extreme miniature.

A series of microscopic sections proves conclusively that the prominence is the outward expression of a mammary gland, and that the minute papillary projection is a nipple. Some of the sections which have passed through the latter, vertically to its exposed surface, show three or four nearly straight and parallel ducts of exit, while in the tissues below is evidence of the existence of glandular alveoli, milk-tubules and ducts. Many large empty hair follicles are also seen in the sections, in connection with

which are conspicuous sebaceous glands, but in no case was the hair itself *in situ*. I presume the long bristle-like hairs, mentioned above, belonged to these follicles, though I am unable to explain why they should have become loose (or wholly detached), while over the remaining surface of the pouch they should have remained firmly adherent.

Ovaries and Ligaments (Figs. 1, 2, and 3).—The ovaries (*ov*) are symmetrical, smooth, oval bodies, with the longer axis placed nearly longitudinally. Each lies in a well-marked pouch or recess constituted by the broad ligament (*ll*) which, sweeping across the pelvis, covers them loosely on their ventral, external, and partly on their posterior surfaces. Behind, the broad ligament passes to the neck and sides of the bladder, where it is lost; laterally, after covering the ventral surface of the oviducts, it extends to the sides and back of the pelvis, one prominent fold, which originates from the outer and hinder region of the ovary, constituting an ovario-pelvic ligament (Fig. 1, *op*). A longitudinal fold of peritoneum on each side, taking origin from the posterior parietes of the abdomen internal to the kidney, and partly also from the lower end of this organ, has its inner edge or margin slightly thickened to form an ovarian suspensory ligament (Fig. 1, *s.l*). On nearing the ovary its hinder end divides into two portions, one of which—the thicker and more distinct—is attached to the upper border of the ovary, and the other—more ventrally placed—to the oviduct near its commencement. Laterally and posteriorly this suspensory peritoneal fold is continuous with the pelvic inflection of the broad ligament as it passes from the ovaries to the sides and back of the pelvis. Springing from the peritoneum, which forms a loose investment for the rectum on its ventral and lateral surfaces, along a line so slightly oblique as to be almost median (Fig. 1, *a*), is a longitudinal fold or septum of peritoneum, having peculiar anterior connections *(b)* with a coil of intestine (*int*) not far from the pylorus, the exact extent and disposition of which requires further investigation. The ventral edge of this median longitudinal fold is attached to the posterior surface of the broad ligament in its middle line, as shown by the shaded line (*c*) in fig. 3, and, in fig. 1, by the faint streak which appears in the broad ligament as the downward continuation of the white line (*a*); this latter representing, as has been stated, the line of attachment to the rectal peritoneum. The disposition of the parts is somewhat similar to that which would obtain if, in a case of uterus bicornis in the human subject, the pouch of Douglas were longitudinally divided by a median septum passing from the peritoneum covering the rectum to the posterior (dorsal) surface of the broad ligament.

In connection with the posterior end of the ovary are a few attenuated, fringed or hydatiform appendages, apparently the remains of vestigial structures.

Oviducts (Figs. 1, 2 and 3, *od*).—The oviducts, sinuous in their anterior or distal segments, lie close to, and follow the contour of, the outer borders of the ovaries. Each apparently commences at a point internal to the anterior border of the ovary, but neither with hand-lens nor microscope could I detect the actual opening; its tissues appeared to be merged insensibly into those of the broad ligament. About the level of the hinder border of the ovary the posterior segment of the oviduct dilates into what is evidently a uterine portion *(ut)*, with a smooth internal surface, but without any appreciable thickening of its parietes; microscopic sections, however, reveal the presence of glandular tubules. These uterine portions of the oviducts converge almost transversely, and meet at a point corresponding to about the middle of the base of the bladder (Fig. 3). After meeting, though the two cavities appear externally to unite into a single tube, they really run for a little distance side by side, separated by a thin septum, and then join the urethra close to the exit from the bladder. The small size and softness of the parts, as well as an unfortunately misdirected incision, prevented my being certain of the exact manner of junction, whether, in fact, previously to joining the urethra, the two uteri do actually unite, or whether they open separately into the uro-genital canal. I did not feel justified, however, in mutilating another specimen for the establishment of this fact alone.

Ureters (Figs. 1, 2 and 3, *ur*).—These pierce the wall of the bladder, and open on its internal surface, distinctly within its cavity, but close to the urethral orifice.

Urogenital Canal (Figs. 2 and 3, *s.ug*).—This is a long, straight, and, relatively, narrow canal, lying, along its whole length, ventral and close to the rectum (Fig. 2, *r*), into which it opens very obliquely by a relatively wide and funnel-shaped orifice situated at a distance of 6 mm. from the anterior margin of the external cloacal aperture.

Clitoris.—Partially concealed in a small depression in the anterior wall of the cloaca, 2 mm. posterior to the entrance of the urogenital canal, and about 4 mm. from the anterior margin of the cloacal orifice is a small lingulate and single-pointed clitoris.

Cloaca (Fig 2, *cl*).—The cloaca, 6 mm. in length along its anterior, and 10 mm. along its posterior wall, has its internal surface irregularly rugose, and is apparently capable of considerable distension. Compared with those of the rectum and intestines its parietes are thick. On each side of the cloaca towards its anterior surface is a conspicuous oval gland, from which a

slender duct proceeding from its hinder end opens into the former by a minute papillary orifice.

Intestines.—The total length of intestine intervening between the pylorus and cloacal aperture is, when unravelled, 29 cm. Arranged in a few simple coils, and of relatively large calibre throughout, the anterior portion is of rather larger calibre than that of the posterior, having on an average a diameter of 5 cm. as against 3·5 cm. to which it diminishes at the point where it is shown as divided in fig. 1, *r*. It is slightly sacculated throughout, rather more so in the anterior than the posterior segment, but there is no marked external indication of a division between parts corresponding to large and small intestines; though, in the interior, an indistinctly marked valve-like projection, situated at a point about 10 cm. from the cloacal orifice, *may* indicate a delimitation; and a sacculation immediately succeeding this, rather more conspicuous than those elsewhere, may indicate a cæcum, but in both respects the observations are of very uncertain value. The mucous membrane throughout its whole length is soft and macerated, and is completely separated, forming an internal cast of the tube, which makes it impossible to distinguish the microscopical details.

Food.—The recognisable debris of the food is confined to the posterior portions of the intestine, the upper containing only granular or soft flocculent and disintegrated material. On examining the former they are found to consist of insect remains, amongst which is a small black ant almost entire. Our President, the Rev. Thomas Blackburn, has been good enough to examine the fragments submitted to him, and he informs me that they are portions of an orthopterous insect, probably those of a species of mole-cricket.

Stomach (Fig. 4).—This organ, which is evidently considerably compressed and contracted, measuring 1·75 cm. in its greatest length by 1·25 cm. in its widest part, is extremely simple in shape, the short segment of œsophagus which intervenes between it and the diaphragm springing from nearly the middle of the lesser curvature, so that about an equal length of the viscus lies on each side of it. It is empty, and the parietes are thick and muscular; the mucous membrane, less decomposed than in the intestines, being thrown into a few large longitudinal rugæ, which end at the pylorus. Externally the position of the pylorus is indicated by a circular constriction, to the intestinal side of which an outlying strip of the pancreas is closely adherent.

Pancreas.—The main mass of this organ lies in the usual situation, but it is too decomposed for accurate description or for determining the disposition of its duct.

Liver.—As far as can be ascertained without removing the organ, and by reference to a damaged specimen from another animal, the liver consists of four distinct lobes, two large and two small, the former being ventral, and separated by a deep fissure. Of these, that on the left hand seems to correspond to the left lobe of the human liver, and the other to the lobus quadratus; of the smaller lobes, that which is dorsal, and on the left (but still to the right of the portal vein), probably corresponds to the lobus Spigelii. The other small one probably represents the human right lobe.

Apparently no gall-bladder exists, but the parts being rather decomposed in that region, I cannot be absolutely certain of this fact. There are, however, two hepatic ducts uniting into a considerable common bile-duct, which opens into the intestine 2·5 mm. from the pylorus.

Spleen.—This is an elongated flattened organ bent on the edge, so that its shape resembles that of the letter V with much expanded limbs.

Myology.—This is being worked out by Professor Wilson, of Sydney University, who will communicate his observations to this Society.

Conclusion.—It is necessary for me again to remark that I am but too well aware of many shortcomings in the above description, nor can I hope to have escaped errors of commission as well as of omission. Some points have been left obscure that undoubtedly might have been cleared up by reference to fresh material, but I was particularly anxious not to damage any more specimens than I could help. The number of them in my possession is still very limited, and I have been desirous in the interests of science both that some should be available for examination by more competent zoologists than myself, and that some other institutions more accessible to the scientific world should share the good fortune of the Adelaide Museum in possessing an example of an animal which is at the same time very difficult to obtain and of unusual zoological interest. I trust, however, that enough of its structure has now been made sufficiently clear to enable a correct conclusion to be formed, both as to its natural affinities and as to the manner in which this singular type—remarkable even in this land of curious and antique forms—should be classed. This discussion, however, must be left to a future occasion.

EXPLANATION OF PLATE XII.

Fig. 1. *Notoryctes typhlops.* Female organs of reproduction, with their ligaments *in situ*. The right kidney is obscured by a coil of intestine. *Ventral view* (x 2½); *ov*, ovary; *od*, oviduct; *ut*, its uterine portion—[the foregoing are represented as seen through the broad ligament (*ll*); for its disposition *vide* text]—*op*, ovario-pelvic fold of the broad ligament; *s.l*, suspensory ligament of ovary and oviduct; *k*, kidney; *ur*, ureter; *bl*, bladder, hooked backwards; *int*, coil of intestine; *r*, rectum; *a*, line of attachment of median fold or septum of peritoneum to that covering ventral surface of the rectum; *b*, peritoneal attachment to coil of intestine (*vide* text).

Fig. 2. *Notoryctes typhlops.* Female organs of reproduction. *Lateral view* partly diagrammatic (x 2); *ov*, ovary; *od*, oviduct; *ut*, uterus; *k*, kidney; *ad*, adrenal; *ur*, ureter; *bl*, bladder; *ll*, broad ligament; *s.ug*, uro-genital canal; *r*, rectum; *cl*, cloaca; *c.g*, cloacal gland.

Fig. 3. *Notoryctes typhlops.* Female organs of reproduction. *Dorsal view* (x 2); *ov*, ovary; *od*, oviduct; *ut*, uterus; *ur*, ureter; *sug*, urogenital canal; *ll*, broad ligament; *bl*, bladder—the fundus, indicated by a dotted outline, is seen through the broad ligament; *c*, line of attachment of median peritoneal fold or septum to the dorsal surface of the broad ligament (*vide* Fig. 1).

Fig. 4. *Notoryctes typhlops.* *Antero-ventral view; (nat. size); gc*, greater curvature; *œ*, œsophagus; *p*, pylorus, pointing also to adherent strip of pancreas; *int*, small intestine; *h.d*, common bile-duct.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October 6, 1891.]

X.

STAPHYLINIDÆ.

SCOPÆUS.

S. dubius, Blackb. The habitat of this species is the Alpine regions of Victoria.

PSELAPHIDÆ.

EUPINES.

E. relicta, sp. nov. Mas. Glabra; nitida; supra lævis; obscure picea, pedibus antennisque dilutioribus; capite fere æquali; prothorace æquali leviter transverso, lateribus fortiter rotundatis pone medium subsinuatis; elytris prothorace dimidio longioribus, humeris callosis, striis suturalibus distinctis; antennis capiti prothoracique conjunctis longitudine æqualibus, modice clavatis; tibiis intermediis extus ante apicem late vix distincte emarginatis; metasterno late profunde excavato; abdominis segmento ventrali 2° in medio breviter transversim carinato. Long., ½ l.

Of the antennæ joints 1 and 2 are somewhat equal *inter se*, both being longer and stouter than the following joints; 3 and 4 are subequal *inter se*, 5 stouter and longer (nearly equal to 2), 6-8 a little shorter than 3 and 4 but not transverse, 9 of the same length but stouter, gently transverse; 10 a little longer and much stouter (rather strongly transverse), 11 twice as long, stouter, and of a darker color.

Femina a mare differt metasterno minus profunde excavato, abdomine haud carinato.

The antennæ of the female differ from those of the male in the fifth joint being smaller, and the ninth not wider than the eighth.

In my tabulation of certain species of *Eupines* (*vide* supra, p. 86) the present species would fall beside *E. militaris*, from which it may be distinguished *inter alia* by its much less strongly clavate antennæ. From *E. Victoriæ*, King, which is very insufficiently described, but perhaps resembles it, it differs by its glabrous surface.

Victoria; taken by C. French, Esq., at Mordialloc, in flood refuse.

LAMELLICORNES.

MÆCHIDIUS.

M. pilosus, sp. nov. Piceo-brunneus; supra pilis elongatis erectis subtilibus sat dense, subtus setis squamiformibus albis et pilis brevibus erectis, vestitus; clypeo antice reflexo late fortiter triangulariter emarginato, ad latera late obtuse bidentato; prothorace transverso, lateribus serratis pone medium angulatis; elytris punctulato-striatis, interstitiis planis vix perspicue punctulatis; antennarum lamellis sat brevibus; unguiculis simplicibus; tibiis anticis sat fortiter tridentatis. Long., 4 l.; lat., $2\frac{1}{8}$ l.

Very distinct from nearly all its previously described congeners by the long, soft, erect hair clothing its upper surface. From *M. bidentulus*, Fairm., it would seem to differ by the strongly serrulate lateral margins of its prothorax; from *M. variolosus*, Macl., by its more strongly emarginate clypeus and its strongly tridentate front tibiæ.

W. Australia; Yilgarn; sent to me by C. French, Esq.

BUPRESTIDÆ.

BUBASTES.

B. occidentalis, sp. nov. Cylindrica; nitida; læte viridis, subaureo-micans, antennis tibiis tarsisque obscuris, corpore subtus pilis squamiformibus brevibus pallide ochraceis sat dense vestito; capite inter oculos sat concavo, fortiter sat crebre punctulato; prothorace quam longiori circiter tertia parte latiori, sat crebre (ad latera transversim rugulose) punctulato; elytris minus fortiter sat crebre sat rugulose punctulatis, manifeste striatis, apice emarginatis et bispinosis. Long., 7 l.; lat., $2\frac{1}{8}$ l.

A bright green species with a somewhat golden tone; compared with *B. inconsistans*, Thoms., and *laticollis*, Blackb., the disc of the prothorax is very much less closely punctured; *B. globicollis*, Thoms., seems to be punctured like *inconsistans*, and to have the sides of the prothorax strongly rounded (in this species they are as in *inconsistans*); *B. sphenoida*, L. & G., is described as having its entire surface evenly punctured (in this species the prothorax is very much more coarsely punctulate than the elytra); the puncturation of *B. cylindricus*, Macl. (from N.W. Australia), is not characterised, but totally different coloring and locality render identity most improbable. *B. splendens*, Blackb., comes near this insect, but is of considerably narrower form, with the

puncturation of the head and the disc of the prothorax considerably sparser, the color more brilliant, &c.

W. Australia; in the collection of C. French, Esq.

B. laticollis, Blackb. I believe this to be identical with *B. globicollis*, Thoms., of which it must become a synonym if I am right in this belief. As I have before remarked, M. Thomson's Appendix to his Typ. Bupr. (in which this and other Australian *Buprestidæ* are described) escaped notice in the *Zoological Record* until some years after its publication, and (owing, I presume, to that omission) was not noticed in Mr. Masters' Catalogue; and so, unfortunately, I was not aware of the existence of the Appendix when I described *B. laticollis*.

B. splendens, sp. nov. Cylindrica; angusta; pernitida; splendide viridis, capite postice antennis que violaceis, corpore subtus pilis brevibus squamiformibus albidis vestito; capite inter oculos sat concavo, fortiter (antice sparsius postice confertim) punctulato; prothorace quam longiori quarta parte latiori, fortiter (disco sparsius lateribus his transversim rugulosis parteque antica sat crebre) punctulato, lateribus fere rectis; elytris sat fortiter sat crebre sat rugulose punctulatis, manifeste striatis, apice emarginatis et bispinosis. Long., 7 l.; lat., 2 l.

An insect of extremely brilliant coloring. Compared with *B. inconsistans*, Thoms., the prothorax is very much more sparsely punctured, and is not rugulose on the disc, while the elytra are less finely punctured, and more distinctly striated.

Central Australia; MacDonnell Ranges; in the collection of C. French, Esq.

MELOBASIS.

M. pulchra, sp. nov. Oblongo-ovalis; læte viridis, prothoracis vittis latis 2 et elytrorum notis intricatis purpureis; capite plano fortiter confertim punctulato; prothorace quam longiori plus quam dimidio (postice quam antice circiter quinta parte) latiori, in disco sat sparsim (ad latera confertim rugulose) fortiter punctulato, lateribus antice sat fortiter rotundatis postice fere parallelis; elytris confuse inæqualiter punctulatis, interrupte striatis, interstitiis hic illic leviter convexis, lateribus apicem versus denticulatis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{3}{5}$ l.

The markings on the elytra are very complicated and difficult to describe clearly; their pattern is most readily characterised if the purple markings be regarded as the ground color; then the green is seen to form (*a*) a wide common sutural vitta from the scutellum more than a quarter of the length of the elytra, (*b*) a somewhat similar but slightly longer vitta on each elytron com-

mencing about the middle of the base and sloping a little towards the suture, (*c*) a fascia-like mark about the middle of the disc not nearly reaching either the suture or the lateral margin and produced a little towards the base of the elytra at its external end (thus forming marks like ⌊ ⌋), (*d*) an oval obliquely placed spot about intermediate between the middle and the apex. The markings are extremely like those of some forms of *M. intricata*, Blackb., but that species has the prothorax very much less coarsely punctured and narrowed (with only slightly arcuate sides) from quite near the base to the apex. *M. fulgurans*, Thoms. (from Tasmania), is also very similarly marked and colored; it is, however, considerably larger (long. 6 l.), and is described as having the prothoracic vittæ black and the prothorax "regulariter punctatus;" M. Thomson's description is too brief to indicate whether the pattern of the elytra bears more than a *general* resemblance to that of the present species.

The sculpture of the head and prothorax is almost exactly as in *M. verna*, Hope, but the sides of the prothorax are much more strongly rounded than in that species.

Central Australia; MacDonnell Ranges; in the collection of C. French, Esq.

M. bicolor, sp. nov. Læte viridis, capite prothoraceque cupreotinctis, elytris totis igneo-cupreis; subtus pilis brevibus sparsis vestita; capite plano confertim fortiter punctulato; prothorace quam longiori dimidio (postice quam antice vix manifeste) latiori, sat fortiter sat crebre punctulato, obsolete (ad latera magis distincte) transversim rugato, lateribus vix arcuatis; scutello minuto; elytris leviter sat crebre parum æqualiter punctulatis, sat distincte 3-costatis, lateribus postice (fere a medio) denticulatis. Long., 5⅔ l.; lat., 2 l.

A conspicuous species on account of its bright fiery-copper-colored elytra. It resembles *M. nervosa*, Boisd., compared with which (apart from color) the head is smaller and less pubescent, the prothorax is a little less strongly punctured, and has less rounded sides, the elytra are not quite so strongly costate, the scutellum is smaller, the underside is much less strongly punctured, and the prosternum is declivous in front, with its anterior margin much less thickened. *M. Saundersi*, Masters, is very distinct by the apical spine of its elytra, and *M. costifera*, Thoms. (which must be very close to *Saundersi*) by the same character; *M. rubromarginata*, Saund. (from N.W. Australia), is very differently colored, and has four costæ on each elytron; *M. læta*, Saund., has the sides of the prothorax rounded, &c.; *M. Lathami*, Hope, has *inter alia* a very differently-shaped prothorax.

W. Australia; in the collection of C. French, Esq.

A. subcostata, sp. nov. Sat lata; sat nitida; cupreo-nigra, hic illic obscure cæruleo-micans; capite postice æqualiter convexo, striolato-alveolato; prothorace tumido (fere gibboso) quam longiori minus quam duplo latiori, ut caput sculpturato, postice quam antice sat latiori, lateribus fortiter rotundatis; elytris longitudinaliter leviter distincte 4-costatis, apicem lateraque versus sat crebre subfortiter granulosis (partibus ceteris obscure squamoso-punctulatis) lateribus postice distincte denticulatis; corpore subtus antice crasse leviter squamoso-punctulato; abdomine longitudinaliter carinulis subtilibus insigni. Long., 3l.; lat., $1\frac{1}{5}$l.

The prothorax is fully as wide as the elytra (to the eye rather wider). The conspicuous (in some lights) blue patches on both upper and under surface, together with the perfectly distinct costæ of the elytra and the ventral segments sculptured with very fine (but not at all close) longitudinal elevated lines, render this a conspicuous species. The prothorax is much less transverse than in *A. Adelaidæ*, Hope; the ventral sculpture resembles that of *A. planifrons*, Blackb.

S.A.; in the South Australian Museum.

A. soror, sp. nov. Sat lata; subopaca; nigra vix æneascens; capite linea longitudinali subtili impresso, sat crebre punctulato, puncturis umbilicatis; prothorace modice convexo quam longiori fere duplo latiori, crebre transversim striolato-alveolato, leviter canaliculato, postice quam antice sat latiori, lateribus sat fortiter rotundatis; elytris subtiliter granulatis, lateribus postice distincte denticulatis; corpore subtus leviter subcrasse alveolato-reticulato, segmento ventrali apicali longitudinaliter carinulis subtilibus insigni. Long., $3\frac{1}{5}$l.; lat., $1\frac{1}{5}$l.

Differs from the preceding *inter alia* by the complete absence of elytral costæ; it is much larger than any others of the previously described species.

N. Queensland; in the collection of C. French, Esq.

A. angusta, sp. nov. Parallela; minus lata; minus depressa; sat nitida; ænea; capite leviter striolato-alveolato, fronte sat late impressa, parte impressa in medio longitudinaliter convexa; prothorace sat convexo, quam longiori fere duplo latiori, postice quam antice haud latiori, in disco subobsolete latera versus distincte striolato-alveolato, margine antico perspicue bisinuato, lateribus leviter arcuatis; elytris manifeste transversim rugulosis obscure punctulatis, lateribus postice indistincte crenulatis; corpore subtus leviter sat crasse striolato-alveolato. Long., $2\frac{1}{5}$l.; lat., $\frac{4}{5}$l. (vix).

Distinguished from the other described species of the genus by its more elongate and parallel form, and its prothorax as wide in front as at the base; also by the impression on the head, which is divided by an obscure longitudinal convexity down the middle; the hinder ventral segments are almost lævigate, and none of the ventral segments are longitudinally sculptured.

This species is, perhaps, near *A. Deyrollei*, Thoms., which, however, is (according to the measurements given) half as wide as long, and is a much smaller insect. M. Thomson's description is quite insufficient for certain identification.

Victoria; in the collection of C. French, Esq.

A. læta, sp. nov. Brevis; lata; modice convexa; sat nitida; obscure ænea, hic illic obscure aureo-vel cyaneo-tincta, elytris sat læte cupreo-purpureis; capite æquali convexo, leviter sat crasse striolato-alveolato; prothorace quam longiori vix duplo latiori, in disco vix distincte ad latera sat fortiter striolato-alveolato, antice sat angustato, lateribus modice rotundatis; elytris sat inæqualibus, distincte subtiliter granulatis, lateribus postice vix perspicue crenulatis; corpore subtus obscure (prosterni lateribus sat crasse sat fortiter) striolato-alveolato, segmentis ventralibus (apicali excepto) longitudinaliter carinulis validis insignibus. Long., $1\frac{1}{2}$ l.; lat., $\frac{3}{4}$ l. (vix).

A wide, short species, more brightly colored than is usual in the genus, and well distinguished by the strong longitudinal carinulæ of its ventral segments (except the last). It is near *A. Adelaidæ*, Hope, and *planifrons*, Blackb., but is distinguished from both, in addition to the characters just mentioned, by its somewhat less transverse prothorax, the sides of which are much less strongly rounded.

S. Australia; Lake Eyre basin.

CISSEIS.

C. dispar, sp. nov. Minus nitida; supra vix pubescens; prasina hic illic obscure subaureo tincta, vel tota sordide aureo-olivacea; capite subtilius minus crebre punctulato, antice late leviter concavo postice subtiliter carinato; prothorace quam longiori fere duplo (postice quam antice parum) latiori, concentrice subtilius striolato, medio antrorsum sat fortiter producto; scutello plus minus distincte transversim striolato; elytris sat æqualiter crebre subtilius leviter punctulatis, plus minus transversim rugatis, lateribus postice subtiliter vel vix distincte denticulatis; corpore subtus sparsim (abdomine ad latera magis crebre) pubescenti. Long., 3 l.; lat., $1\frac{1}{5}$ l.

The color is a dull grass-green, tinged in places with a dead brassy-copper tone, which is liable to overspread the whole upper

surface; the underside is more nitid, and usually darker in color than the upper surface. The puncturation of the head is almost as in *C. roseocuprea*, Hope (more consisting of isolated punctures, and less tending to a striolated appearance than in most of its congeners); the shape and sculpture of the prothorax are nearly as in *C. æneicollis*, Hope (but without pubescent spots); the sculpture of the elytra has a slightly asperate appearance, being reticulately and minutely strigose, with the interstices of the strigæ somewhat resembling flattened granules, or it can be regarded as consisting of punctures surrounded with elevated margins. It is not very different from the elytral sculpture of *C. æneicollis*, Hope, but appears distinctly more asperate. The short longitudinal, carina-like, fine line on the summit of the head is characteristic. Probably this species is near *C. subcarinifrons*, Thoms., but the description of that species states that its prothorax is not transverse.

Victoria; sent to me by C. French, Esq.

C. bella, sp. nov. Sat angustata; nitida; aureo-ænea, elytris subpurpurascentibus, his et metasterni coxarum posticarum abdominisque lateribus maculis albis pubescentibus ornatis; capite antice longitudinaliter late sulcato, fortiter minus crebre punctulato et indistincte confuse strigato; prothorace quam longiori dimidio (postice quam antice parum) latiori, sparsim sat fortiter punctulato et subconcentrice minus crebre sat fortiter strigato, versus angulos posticos sat depresso, lateribus leviter arcuatis; scutello punctis nonnullis magnis notato; elytris minus confertim reticulato-striolatis, interspatiis subgranulosis, lateribus postice crenulatis. Long., 3 l.; lat., 1 l.

A brilliantly nitid species (especially the head and prothorax), with the head more coarsely punctured than in most of its congeners; it is perhaps near *C. cupreicollis*, Hope, but differs *inter alia* by its prothorax entirely devoid of pubescent spots. The pubescent spots on the elytra are arranged very much as in *C. æneicollis*, Hope, there being one on the shoulder, one near the lateral margin about the middle, one half way between the last-named and the apex, and one on the suture a little in front of the apex, the two nearest to the apex appearing to form an interrupted fascia. The elytra of *C. æneicollis* bear some additional smaller pubescent spots, which are wanting in this species (I do not think the example before me is at all abraded). Compared with *C. æneicollis* the present insect is of much narrower and more elongate form, with the puncturation of the head much less close, the prothorax very evidently less transverse, and the elytral sculpture (though of similar kind) markedly less close.

Victoria; in the collection of C. French, Esq.

C. pygmæa, sp. nov. Sat angusta; minus nitida; ænea vel nigro-ænea, hic illic vix cyaneo-micans; pube albida maculatim ornata; capite late longitudinaliter concavo, sparsius vix fortius punctulato; prothorace quam longiori fere duabus partibus (postice quam antice haud multo) latiori, subtilius subconcentrice striolato, lateribus sat rotundatis, basi valde bisinuata; scutello opaco vix perspicue striolato; elytris crebre subtilius reticulato-striolatis, interspatiis vix distincte granuliformibus, lateribus postice denticulatis. Long., 2 l. (vix); lat., $\frac{7}{10}$ l.

The silvery-white pattern is not formed by pubescent impressions, but by coarse scale-like hairs, more or less sprinkled over the whole surface, but condensed into a large spot on the hinder part of the disc of the prothorax on either side, a large ill-defined spot on the base of the elytra, two wide ill-defined fasciæ on the elytra (one at the middle, the other near the apex, the latter somewhat dilated hindward on the suture and a little curved outwards close to the apex), and some spots on the sides of the ventral segments. I do not think this species is much like any of the very small species of *Cisseis* that have been described previously.

Victoria; in the collection of C. French, Esq.

C. verna, sp. nov. Sat angusta; sat nitida; viridis, hic illic cæruleo-micans; capite planato medio longitudinaliter sat subtiliter impresso, subopaco, coriaceo, sparsim minus fortiter punctulato; prothorace quam longiori duabus partibus (postice quam antice vix manifeste) latiori, vix distincte punctulato, in disco subtiliter (latera versus fortiter) transversim subconcentrice striolato, lateribus leviter arcuatis; scutello punctulato-striolato; elytris leviter sat crebre reticulato-punctulatis, lateribus postice subtiliter denticulatis. Long., $2\frac{1}{3}$ l.; lat., $\frac{4}{5}$ l.

There is a little very inconspicuous whitish pubescence on the elytra, where, however, it does not form a distinct pattern. The parts where the general bright green colour changes most distinctly to cyaneous are the apices of the elytra and the undersurface (the legs, however, being green). The sides of the metasternum and of the ventral segments are more or less pubescent. The prothoracic sculpture consists of transversely arched (scarcely concentric) striolæ, which are mere fine scratches in the middle, but deepen into strong wrinkles towards the sides. The surface of the prothorax is much depressed in the neighbourhood of the hind angles. In some lights the anterior part of the suture shows a distinctly golden tone of colour. The sculpture of the elytra is of the kind usual in allied species of *Cisseis* (*e.g.*,

much like that of *C. æneipennis*, Hope, but perhaps a little less close).

This species is no doubt near *C. uniformis*, Thoms., and *minutissima*, Thoms., the former of which, however, is said to have the prothorax not transverse, the scutellum lævigate, &c.; while the latter is said to be of the form of an *Anthaxia* (which the present insect certainly is not), and also to have the prothorax "punctate-rugose."

Victoria.

C. perplexa, sp. nov. Sat elongata; convexa; sat nitida; nigricans, cupreo-micans (præsertim subtus), corpore subtus prothoracis lateribus capiteque sparsim argenteo-pilosis; capite fere æquali, antice leviter impresso, confuse sat fortiter vix crebre punctulato; prothorace quam longiori dimidio (postice quam antice vix perspicue) latiori, concentrice minus fortiter striolato, lateribus per carinæ intramarginalis intercessionem vix æqualibus, hac fortiter arcuata marginem anticum ad angulum lateralem vix attingenti; scutello subcoriaceo vix perspicue punctulato; elytris inæqualiter sat crasse rugulosis, antice et ad latera fortiter transversim rugatis, lateribus postice denticulatis. Long., 4 l.; lat., $1\frac{3}{5}$ l.

This species belongs to a small group of *Cisseis* (of which *C. Lindi*, mihi, may perhaps be considered the type distinguished by the extreme feebleness of the tooth on the claws, and also by the peculiar form of the intra-marginal carina of the prothorax, which is strongly arched, and touches (or nearly so) the true lateral margin, both at the base and apex instead of ending anteriorly (as in most species of *Cisseis*) on or close to the anterior margin considerably within its lateral extremity, and which consequently more or less crosses the outline (as seen from above) of the true lateral margin and makes the sides of the prothorax, as viewed from above, seem more or less uneven. All these species (as yet known to me) are entirely devoid of markings formed by pubescence, and are found in Western and South-Western Australia.

The present species is distinguished from the others of the group (independently of its more uniform and obscure coloring) by the much coarser sculpture of its elytra. This is of the same character as in most species of *Cisseis* (much as described above in *C. dispar*), but the interspaces of the wrinkles are unusually large, in front and towards the side being strongly transverse, and in parts of the disc appearing almost like irregular pustules.

Australia; I am not sure of the exact locality, but I have no doubt it is Western.

DISCODERES.

D. torridus, sp. nov. Læte æneus, corpore subtus antice femoribusque cyaneis; pilis densis albis nigrisque maculatim dispositis vestitus; capite prothoraceque valde inæqualibus, striolato-alveolatis; scutello magno elongato triangulari; elytris singulis costam discoidalem ferentibus, acervatim punctulatis et in partibus nonnullis transversim rugulosis, lateribus postice crenulatis; tibiis posticis extus ad apicem dentiformibus. Long., 5 l.; lat., 2 l.

The sculpture of the upper surface is to a great extent concealed by dense pubescence, forming a pattern of marbled appearance; this pubescence takes the form of a transverse white fascia between the eyes, a dense white mass on each side of the prothorax, a number of smaller white spots on the elytra (some of which range themselves into two fasciæ behind the middle), some large black spots mostly in the hinder half of the elytra, a lateral white spot on the hind coxæ, a dense white mass on either side of the basal two ventral segments and some smaller white spots on the other ventral segments. The crown of the head bears two rounded and moderately conspicuous gibbosities; the prothorax is widely elevated down the middle line, the elevated portion bearing a ridge-like tubercle on either side in its hinder half; the elytra are much flattened (or almost concave, between the suture and the discoidal ridge. The sculpture of the prothorax is arranged in concentric lines. The carina within the border of the prothorax on either side is elongate and sinuous.

N. Queensland; in the collection of C. French, Esq.

CORÆBUS.

C. pilosicollis, sp. nov. Latus; æneus hic illic cyaneo-micans; prothorace utrinque et segmentis ventralibus (apicalibus 2 exceptis) dense (elytris obscure maculatim) albo-pubescentibus; capite valde inæquali, fortiter punctulato et certo adspectu longitudinaliter strigoso; prothorace in medio longitudinaliter gibboso, antice fortiter declivi, postice utrinque transversim profunde concavo, concentrice sat crasse striolato, intra marginem utrinque postice carina brevi instructo; scutello fortiter transverso, postice acuminato, ut prothorax striolato; elytris sat fortiter sat rugulose sat crebre punctulatis. Long., 6 l.; lat., 2½ l.

The arrangement of the pubescence is very distinctive; the pubescence is thin and little noticeable except on the sides of the prothorax and the whole abdomen (except the apical two segments), which are densely clothed with tolerably long silvery-white soft hairs. The chief inequalities on the head are a strong sulcus down the middle, a large transverse excavation between

the eyes and a strong carina on either side bordering the eyes within.

I refer this insect to *Corcebus* a little doubtfully, as its facies is hardly of that genus; the short basal joint of the tarsi, transverse scutellum abruptly pointed behind, and short lateral carina of the prothorax seem, however, to place it there.

N. Queensland; in the collection of C. French, Esq.

AGRILUS.

A. Frenchi, sp. nov. Obscure viridis; pube tenui argentea minus crebre vestitus, vitta humerali et fascia postmediana denudatis; prothorace vix transverso, antice quam postice latiori, subtiliter transversim striolato, in medio longitudinaliter sulcato, postice utrinque impresso; scutello subcoriaceo, elytris sat crebre subrugulosis, apice emarginatis et spinis validis binis armatis. Long., $2\frac{4}{5}$ l.; lat., $\frac{3}{5}$ l.

Extremely distinct from the previously-described Australian *Agrili*, especially by the strongly bispinose apices of the elytra.

Victoria; in the collection of C. French, Esq.

PARACEPHALA.

P. ænea, sp. nov. Elongata; subcylindrica; sat nitida; ænea; pilis argenteis minus sparsim vestita; capite longitudinaliter canaliculato, quam prothorax magis nitido, sat fortiter sat crebre punctulato; prothorace elytrisque sat æqualiter confertim granuloso-punctulatis; illo fortiter transverso, disco medio subgibboso, parte gibbosa transversim subcarinata; elytris postice rotundatis denticulatis; corpore subtus latera versus sat dense argenteo-pilosis. Long., 3—$3\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.—1 l.

The peculiar form of the prothorax will render this species easily recognisable. The prothorax is scarcely marked off by a distinct line from the flanks of the prosternum. The present insect does not seem to differ structurally from *Paracephala (Agrilus) pistacina*, Hope, though it is very much larger, and its form is distinctly less narrow and cylindric; it is very similar in general facies to the species which I take to be *P. murina*, Thoms.

N. W. Australia.

CLERIDÆ.

ALLELIDEA.

The species described below is evidently a member of this genus. The basal joint of the tarsi being quite exposed when viewed from above would seem to place the genus near *Tillus*.

A. viridis, sp. nov. Cylindrica; linearis; nitida; pilis erectis sparsis vestita; viridi-ænea, antennis (clava excepta) palpis pedibusque (tibiis plus minusve infuscatis exceptis) flavis vel

rufis, elytrorum lateribus postice albidis; capite crebre, prothorace sparsim, elytris subseriatim, fortiter punctulatis; Long., 2—2½ l.; lat., ⅓ l.

The insect is at its narrowest where the prothorax meets the elytra; the head, the middle of the prothorax, and the elytra close to the apex are about equal in width, and are the widest parts of the body. The prothorax is much longer than wide, and is narrow in the basal and apical parts being strongly and roundly dilated at, or slightly in front of, the middle. The elytra are considerably shorter than the hind body in the larger examples (which I take to be females), in a smaller one (probably a male) they are slightly longer than the hind body. The whitish color on the elytra is confined to the hinder part of the lateral margin in some examples, in others it covers the apex.

Victoria; taken by C. French, Esq., in flood refuse at Mordialloc.

CORMODES.

C. constricta, Blackb. This species described by me (Tr. Roy. Soc., S.A., 1890, p. 124) as a *Natalis* must be placed in *Cormodes* which Mr. Pascoe (Journ. of Ent., I., p. 46) characterises as closely allied to *Natalis*, but differing in the absence of wings, and in the elytra having no defined humeral angle. The wings of *C. constricta* are not quite wanting, but they are so rudimentary as to be useless for flight.

TARSOSTENUS.

T. univittatus, Rossi. I do not think that this cosmopolitan insect has hitherto been recorded as Australian. I have found it near Adelaide.

ZENITHICOLA.

Z. sosius, Chevr. The habitat of this species is given as "Australia." I have an example in my collection ticketed "South Australia."

Z. (*Clerus*) *crassus*, Newm. This species is certainly a *Zenithicola*; and equally certainly, I think, *Z.* (*Clerus*) *obesus*, White, is identical, so that the latter name must sink into a synonym.

TROGODENDRON.

T. (*Notoxus*) *ephippium*, Boisd. I do not think there is the least doubt that Boisduval's *Notoxus ephippium* is a *Trogodendron*, and I take it to be equally certain that *Notoxus ephippiger*, White, is the same thing. Although the examples for which the two names were proposed do not appear to have been even different varieties, the species appears to be a variable one, as I have seen examples with markings as specified in the descriptions, and others that I take to be certainly not

distinct specifically, in which the yellow spot on the suture is very indistinct or even quite wanting. M. Chevrolat, in his Catalogue of the *Clerida*, places *N. ephippiger*, White, in *Opilus*; but I feel confident this is a mistake, as the finely-granulated eyes of specimens before me (which agree exactly with Boisduval's unusually full description, and also with White's) are quite inconsistent with a place in that genus. M. Chevrolat does not seem to have noticed the almost literal identity of White's and Boisduval's descriptions; indeed, I cannot find that he has referred to the latter at all.

THANASIMOMORPHA (*gen. nov.*).

Thanasimo affinis; differt palporum maxillarium articulo ultimo securiformi.

The Rev. H. S. Gorham (Cist. Ent., II., p. 62) points out the necessity of a new name for *Tillus bipartitus*, Blanch., but without proposing one. I therefore suggest the above name. Another member of the genus (as Mr. Gorham points out) is *Clerus guttulus*, White.

T. intricata, sp. nov. Nigro-picea vix violacea-micans, antennis palpisque obscure rufo-piceis, elytrorum tertia parte basali maculaque suturali postmediana metasterno femoribus ad basin tibiis anterioribus 4 (subtus) et tibiis posticis (totis) rufis, elytrorum fascia mediana (suturam vix attingenti) eburnea; capillis erectis vestita, ex his nonnullis albidis (in elytrorum pone medium partibus dilutioribus condensatis) nonnullis nigris; capite prothoraceque crebre profunde rugulose punctulatis, hoc quam longiori vix latiori, latitudine majori pone medium posita, lateribus sat rotundatis basin versus vix sinuatis; elytris basi utrinque gibbosis, antice crasse profunde postice vix manifeste, punctulatis. Long., $2\frac{1}{8}$ l.; lat., $\frac{3}{8}$ l.

Resembles *T. bipartita*, Blanch., but with the femora (except at base) and antennæ almost black, and a large red spot on the suture of the elytra behind the white fascia, and with the prothorax less rounded on the sides, and a little less closely rugulose.

W. Australia; taken by E. Meyrick, Esq.

METABASIS.

M. variegata, sp. nov. Fusco-nigra, pilis albis fuscisque vestita, ore palpis antennis prothorace elytrorum parte (fere dimidia) basali pedibusque rufis, elytrorum fascia media leviter arcuata et striga suturali apicali flavis; capite crasse confertim prothorace elytrisque crassissime minus confertim, punctulatis; prothorace fortiter transverso, late longitudinaliter sulcato, sulci lateribus antice subcariniformibus;

elytrorum sculptura apicem versus paullo minus crassa. Long., 2 l.; lat., $\frac{4}{5}$ l. (vix).

Var. ? Prothorace elytrisque (notis flavis exceptis) totis fusco-nigris.

In the typical form the red and blackish portions of the elytra are separated from each other by the yellow median fascia except close to the lateral margin, where the blackish color is to be traced to some extent in front of the fascia. Differs from *M. accincta*, Newm. (apart from colour and size) by the median fascia of the elytra being gently arched all across (instead of straight)—its convex side forward—by the apical yellow of the suture extending considerably further forward, by the prothorax being evidently more transverse with a wide well-defined convexity down the middle, the external boundary of which is in front, distinctly subcariniform on either side, and by the puncturation of the whole upper surface being very evidently coarser and less close. In the dark var. there is no trace of pale coloring along the basal margin of the elytra.

S. Australia; under bark of Eucalyptus in the Tumby Scrub, near Port Lincoln.

PARAPYLUS (gen. nov.).

I propose this name for the insect which Mr. Newman described as *Pylus bicinctus*, and which subsequently was called *Necrobia pinguis*, White. The Rev. H. S. Gorham (Trans. Ent. Soc., 1878) has already discussed the characters of this type, and pointed out the need of a new generic name for it, but without proposing one.

CROBENIA (gen. nov.).

Necrobiæ affinis, sed oculis subtiliter granulatis, antennarum clava elongata laxe articulata.

This genus resembles *Necrobia* in its four-jointed tarsi with the basal joint covered by the second, in its laterally margined prothorax, and in the structure of its palpi, but the eyes are finely granulated and the antennal club is elongate, and consists of three joints, none of which is decidedly transverse. It is distinguished from *Paratillus*, *inter alia*, by its much less elongate form and different antennal club, from *Pylus* and *Parapylus* by the structure of its tarsi. The name I have used is an anagram of *Necrobia*.

C. Eyrensis, sp. nov. Sat nitida; sparsim albo-hirta; cyaneo-nigra, antennarum articulo basali prothorace et pedibus rufis; capite confertim sat crasse prothorace elytrisque crassissime minus confertim punctulatis. Long., 2 l.; lat., $\frac{4}{5}$ l.

The prothorax is nearly half again as wide as long and is nearly evenly and rather strongly rounded laterally, but is at its widest slightly behind the middle; its lateral edges are finely but not very closely crenulate.

S. Australia; Basin of Lake Eyre.

PYLUS.

P. pygmæus, sp. nov. Testaceo-brunneus, elytris piceo-notatis; sparsim breviter pilosus; capite prothoraceque sat crasse nec crebre punctulatis; hoc vix transverso, medio longitudinaliter late nec profunde concavo, lateribus pone medium leviter rotundatim dilatatis; elytris striato-punctulatis prope apicem sculptura obsoletescenti. Long., $1\frac{4}{5}$ l.; lat., $\frac{3}{5}$ l.

The piceous markings on the elytra are not very clearly defined. They consist of a fascia slightly in front of the middle which is tolerably wide close to the lateral margin and narrows towards (but scarcely reaches) the suture, and another somewhat similar but much wider fascia slightly behind the middle and extending nearly to the apex; this hinder fascia is less narrowed than the anterior one towards the suture.

The coarsely-granulated eyes, laterally margined prothorax, and antennal and tarsal structure associate this very small *Clerid* with *Pylus fatuus*, Newm.

S. Australia; near Port Lincoln, in stems of *Xanthorrhœa*.

LYMEXYLONIDÆ.

ATRACTOCERUS.

A. Victoriensis, sp. nov. Ater; nitidus (capite elytrisque exceptis); capite creberrime ruguloso; prothorace quam latiori vix longiori, canaliculato, subquadrato, retrorsum leviter angustato, crebre sat fortiter punctulato; elytris crebre subtiliter aspere punctulato; abdomine supra a basi retrorsum gradatim minus perspicue punctulato, subtus fere lævi. Long., $8\frac{1}{4}$ l.

The previously-described Australian species of this genus (*A. Kreuslerœ*, Pasc.) is a much larger insect (long., 12 l.), and is of a ferruginous colour; as the specific characters mentioned in the description are almost limited to colour, it is not possible (without seeing the type) to distinguish this species from it otherwise than by saying that it is much smaller and entirely black.

Victoria; in the collection of C. French, Esq.

PTINIDÆ.

ANOBIUM.

A. paniceum, Lin. I do not think this species has been hitherto recorded as Australian; it is, however, common and widely distributed, no doubt introduced.

A. domesticum. This also occurs in Australia; I have found it near Port Lincoln; as far as I know its occurrence has not been previously recorded.

DRYOPHILODES (gen. nov.).

Dryophilo affinis sed antennis aliter articulatis, articulo 2° quam 3^{us} minori, articulis apicalibus præcedentibus haud dissimilibus.

The species for which I propose this name resemble *Dryophilus*, but their antennæ with the second joint small and no marked distinction between the apical joints and those preceding them seem inconsistent with a place in that genus.

D. insignis, sp. nov. Sat elongatus; sat parallelus; niger, vix rufescens, pube ochraceo-cinerea dense vestitus; prothorace maculis parvis 3 (transversim positis), elytris macula magna communi ovali denudata ornatis; hac pube alba circumcincta; scutello dense albo-piloso; prothorace sat convexo, inæquali vix transverso, antice fortiter rotundato-producto, lateribus bisinuatis, angulis posticis acute rectis deplanatis, basi media late lobata; antennis quam corporis dimidium longioribus. Long., 1¼ l.; lat., ¾ l.

The sculpture is entirely buried under close pubescence, except on the denuded spots, where it appears that the prothorax is closely and asperately punctulate, and that the elytra are coriaceous rather than distinctly punctured. The large common oval spot occupying about the middle third part (both of length and breadth) of the elytra, with its conspicuous edging of white pubescence, renders this a most conspicuous species. The basal joint of the antenna is about as long as the next two together; 2 is slightly shorter than 3; 3-5 increase slightly in length; 6 is equal to 5; 7-10 are slightly longer, and equal *inter se;* 11 is slightly longer than 10; joints 4-10 are feebly triangular, and each joint being inserted slightly outside the middle point of the truncate apex of the preceding joint, the antennæ have a slightly serrated appearance.

Victoria; Alpine district.

D. australis, sp. nov. Minus elongatus; sat parallelus; piceus, antennis capite prothoracis marginibus abdomine pedibus et sutura postice rufescentibus; pube brunnea minus perspicue vestitus, scutello dense albido-hirto; capite prothoraceque confertim subtiliter subaspere punctulatis; hoc vix inæquali fortiter transverso antice modice rotundato-producto, lateribus fortiter rotundatis ante basin sinuatis, angulis posticis rectis, basi media late lobata; elytris crebre obscure punctulatis, obsoletissime striatis; antennis quam corporis dimidium vix longioribus. Long., 1⅔ l.; lat., ⅔ l.

The antennæ are a little shorter than in the preceding species, but their structure and the proportional lengths of the joints *inter se* are not different.

Victoria; Alpine district.

CISSIDÆ.

CIS.

C. Victoriensis, sp. nov. Minus angustus; sat nitidus; niger, antennis (clava excepta) pedibusque rufis; setis brevibus aureis sat dense vestitus; prothorace minus fortiter minus crebre, elytris leviter obscure fere subcrasse, punctulatis; capite planato vix perspicue punctulato fovea mediana impresso, margine antico explanato et (maris) profunde emarginato. Long., $\frac{3}{4}$—$\frac{4}{5}$ l.; lat., $\frac{1}{3}$ l.

Victoria; Alpine district; in fungi growing on trees.

OROPHIUS.

O. dilutipes, sp. nov. Nitidus; fere glaber; nigro-piceus, elytris abdomineque obscure rufescentibus, antennis (clava excepta) pedibusque testaceis; capite prothoraceque obscure subtilissime, elytris minus subtiliter, minus crebre punctulatis.

Maris capite antice perpendiculari, parte perpendiculari subcarinato-marginato et superne utrinque anguliformi; mandibulis porrectis, quam caput vix brevioribus, apice bifidis.

Feminæ capite æquali; mandibulis sat brevibus. Long., 1 l.; lat., $\frac{1}{3}$ l.

The prothorax is scarcely so wide as long, and is gently contracted from the base forwards, with its front margin considerably and roundly produced.

Victoria; Alpine district; in fungi growing on trees.

CISTELIDÆ.

ANAXO.

A. æreus, sp. nov. Sat nitidus; sat dense albido-pubescens; æreus; palpis (articulo ultimo excepto), antennarum articulis 2° 3° que (hujus apice infuscato) et articulorum nonnullorum sequentium basi, tibiis (his apicem versus infuscatis) tarsisque, rufis; capite angusto elongato, confertim subrugulose (labro crasse sparsim excepto) punctulato; prothorace sat parallelo, antice leviter rotundato-angustato, ut caput (sed etiam magis confertim) punctulato, quam latiori fere longiori, postice late leviter longitudinaliter canaliculato; elytris sat parallelis, quam prothorax minus quam duplo latioribus, punctulato-striatis, striis suturam prope sat pro

fundis apicem versus obsoletescentibus, interstitiis punctulatis et transversim rugatis; antennarum articulo 3° quam 4ᵘˢ paullo longiori, 11° quam 10ᵘˢ vix minori.

Variat antennis tibiisque magis nigris vel magis rufis. Long., 4 l.; lat., 1 l.

I have not been able to satisfy myself as to the validity of the characters of the Australian genera which Mr. Bates has characterised near *Æthyssius* (Atractus). The shortness of the apical joint of the antennæ seems to vary with the sex, and also with the species; nor do I find the slight elongation of the second joint of the maxillary palpi at all a workable character, as it would lead to the separation into different genera of species that are (even as *species*) very closely allied. In the present insect the apical antennal joint is in one sex not, and in the other scarcely shorter than the tenth joint; indeed, I cannot find much to distinguish the insect from *Æthyssius*. It, however, resembles *A. brevicornis*, Bates, too much in general facies to be separated from it generically, in the absence of strongly-marked characters.

The species of this genus have much superficial resemblance to *Leptura*.

Victoria; Alpine district; on flowers.

A. Lindensis, sp. nov. Sat nitidus; albido-pubescens; niger vix æneus, femorum basi tibiisque flavis, his apicem versus plus minusve infuscatis, exemplorum nonullorum antennis basi obscure rufis; ut præcedens sculpturatus; capite paullo minus elongato, quam prothorax haud angustiori; prothorace vix canaliculato, antice vix angustato; elytris fere ut præcedentis sed minus parallelis, retrorsum a basi (præsertim maris) manifeste angustatis; antennarum articulo 3° quam 4ᵘˢ vix longiori, apicali quam 10ᵘˢ sat breviori. Long., 3 l.; lat., $\frac{4}{5}$ l.

S. Australia; on flowers near Port Lincoln.

A. cylindricus, Germ. (var.? *obscurus*). Ab exemplo typico differt antennis paullo magis elongatis, his pedibusque totis nigropiceis.

S. Australia; near Port Lincoln.

A. affinis, sp. nov. Sat nitidus; albido-pubescens; obscure niger, elytris fusco-æneis, pedibus (horum femoribus apice late nigris) antennarum basi palpis labroque testaceis; fere ut *A. æreus* sculpturatus sed elytris magis subtiliter punctulatis; capite prothoraceque fere ut *A. Lindensis*, sed hoc ante basin fovea rotunda impresso; elytris (sculptura excepta) ut *A. ærei*; antennis quoque ut *A. ærei*. Long., 4 l.; lat., 1 l.

Like *A. Lindensis*, this species is at once distinguished from

A. æreus by its much wider head and its prothorax scarcely at all narrowed in front. From *A. Lindensis* it differs apart from colour and the finer elytral sculpture by the relatively longer third and apical joints of the antennæ, the former being markedly longer than the fourth, and the latter being scarcely, if at all, shorter than the tenth, while in *A. Lindensis* of both sexes it is quite evidently shorter.

S. Australia; near Port Lincoln.

A. ater, sp. nov. Nitidus; pilis erectis albidis vestitus; niger-rimus, palpis (articulo apicali excepto) mandibulisque rufescentibus; capite planato, crebre (labro sat sparsim) fortiter punctulato; oculis sat prominulis; prothorace sat parallelo quam caput vix latiori, subfortiter minus crebre nec rugulose punctulato, antice leviter obscure impresso, ante basin fovea magna rotunda profunda instructo; elytris sat parallelis quam prothorax minus quam duplo latioribus, sat fortiter (latera versus minus fortiter) punctulato-striatis, interstitiis sat crasse punctulatis et transversim rugatis; antennarum articulo 3° quam 4^{us} fere sesqui longiori, apicali quam 10^{us} vix breviori.

Maris femoribus posticis subtus late subdentatis; tibiis posticis flexuosis, in medio valde compressis et extus dilatatis; tibiis intermediis arcuatis. Long., 3 l.; lat., $\frac{4}{5}$ l.

The sculpture of this species is very similar to that of the S. Australian insect, which I take to be *A. brevicornis*, Bates, the prothorax being much less closely punctured than that of any of the preceding three species. From *A. brevicornis* (apart from size and color) it differs by its remarkable male characters. The hind femora are not, strictly speaking, "toothed," but their lower outline appears to be formed by two lines which meet in the middle in a distinct angle. It also differs from its allies in its eyes being evidently more prominent.

Victoria; Alpine district.

A. sparsus, sp. nov. Angustus; nitidus; fere glaber (? exemplo abraso); niger, antennarum basi mandibulis pedibusque rufescentibus; capite quam prothorax sat angustiori, fortiter minus crebre punctulato; prothorace leviter transverso sat parallelo crebrius subfortiter punctulato, dorso obscure depresso; elytris parallelis quam prothorax minus quam duplo latioribus, fortiter (latera versus paullo minus fortiter) punctulato-striatis, interstitiis subconvexis sparsim subtiliter punctulatis haud transversim rugatis; antennarum articulo 3° quam 4^{us} paullo longiori, apicali quam 10^{us} vix breviori. Long., 6 l.; lat., $1\frac{4}{5}$ l.

Resembles *Anaxo* (*Allecula*) *cylindricus*, Germ., but differs from

it *inter alia* by its still narrower and more parallel form, by the punctures of its head more sparse and large, by its prothorax a little less closely and more strongly punctured, and by the striæ of its elytra more strongly, and their interstices much less closely and strongly punctured. From the widely-distributed S. Australian insect, which I regard as *A. brevicornis*, Bates, it differs *inter alia* by its more parallel form, its less-closely punctured head, and its elytra quite differently sculptured.

Victoria; in the collection of C. French, Esq.

A. puncticeps, sp. nov. Nitidus; obscure albido-pubescens; fuscus, antennis femoribus sternorum lateribus abdomineque nigris; capite quam prothorax paullo angustiori, creberrime (antice gradatim minus crebre) fortius sat rugulose punctulato; prothorace quam latiori vix longiori sat parallelo, medio ante basin leviter impresso, confertim sat subtiliter punctulato; elytris minus parallelis quam prothorax fere duplo latioribus, sat fortiter punctulato-striatis, striis latera versus obsoletescentibus, interstitiis crebrius fortius punctulatis vix transversim rugatis; antennarum articulo 3° quam 4^us^ paullo longiori, apicali quam 10^us^ manifeste breviori. Long., 5½ l.; lat., 2 l.

Very similar to *A. cylindricus*, Germ., in form, from which (apart from colour) it differs *inter alia* by its conspicuously narrower head and prothorax, by its somewhat longer and more slender legs and antennæ, and by its less-strongly impressed elytral striæ, which become much more enfeebled towards the lateral margins.

This species bears a superfical resemblance to *Homotrysis fuscipennis*, Blessig, from which its simply pointed mandibles at once distinguish it.

Victoria; in the collection of C. French, Esq.

A. occidentalis, sp. nov. Nitidus (capite prothoraceque fere subopacis); vix albido-pubescens (? exemplo abraso); niger, elytris fuscis, labro mandibulis palporum antennarumque basi et pedibus fusco-testaceis; capite quam prothorax sat angustiori, sat confertim sat rugulose (labro sparsissime) punctulato, oculis sat prominulis supra minus remotis; prothorace quam longiori vix latiori, creberrime subtiliter subconfluenter sat aspere punctulato, ante basin leviter impresso, antice manifeste angustato, lateribus antice arcuatis; elytris postice leviter dilatatis, fortiter (latera versus multo minus fortiter) punctulato-striatis, interstitiis subconvexis sparsim subtiliter punctulatis; antennarum articulo 3° quam 4^us^ sat longiori, apicali quam 10^us^ paullo breviori. Long., 4 l.; lat., 1 $\frac{3}{10}$ l.

The extremely close puncturation of the prothorax, which

renders the surface subopaque, and tends to become confluent in forming longitudinal wrinkles, will at once distinguish this species from its previously described congeners.

The apical joint of the maxillary palpi is a little shorter and more widely cultriform than in the allied species. This character is suggestive of *Licinnius*, Bates, but I do not find it accompanied by the other characters mentioned as distinctive of that genus. It is likely that Mr. Bates would regard this as a new generic form.

W. Australia.

The following is a tabulation of the hitherto described species of Anaxo :—

A. Prothorax not subopaque through the presence of very close longitudinally confluent puncturation.
  B. Puncturation of head very noticeably closer than of prothorax.
    C. Interstices of elytra closely punctured.
      D. Legs entirely black ... ... ater, Blackb.
      DD. Legs partly yellow ... ... brevicornis, Bates
    CC. Interstices of elytra sparingly punctured. ... ... puncticeps, Blackb.
  BB. Puncturation of head and prothorax equally (or nearly so) close
    C. Species of a distinctly metallic tone of color.
      D. Head not (or scarcely) narrower than prothorax.
        E. Apical joint of antennæ distinctly shorter than tenth joint. ... ... Lindensis, Blackb.
        EE. Apical joint of antennæ not shorter than tenth joint ... ... affinis, Blackb.
      DD. Head much narrower than prothorax. ... ... æreus, Blackb.
    CC. Color not at all metallic.
      D. Interstices of elytra very finely and very sparingly punctulate ... ... sparsus, Blackb.
      DD. Interstices of elytra much more closely and strongly punctulate ... ... cylindricus, Germ.
AA. Prothorax subopaque through the presence of very close longitudinally confluent puncturation. occidentalis, Blackb.

The description of *A. fusco-violaceus*, Fairm., does not enable me to place that species in my tabulation, but it appears to differ from all the above in its cyaneous or violaceous colour.

N.B.—It appears to me (as already intimated) difficult to characterise *Anaxo* by very satisfactory structural characters among the Australian *Cistelidæ* having the mandibles simply pointed at the apex, the head well-prolonged in front, the apical joint of the maxillary palpi elongate-cultriform, and the legs and antennæ more or less stout and short. Its species (so far as known to me) are distinguished by their more or less parallel form and obscure coloring, none of them being brilliantly metallic (as are *Æthyssius* and *Alcmæonis)* or brightly colored or with markings on elytra or prothorax (as are *Licymnius*, *Chromomæa* and *Apellatus)*. The eyes are not approximated to each other in either sex. There are also slight structural characters attributed to each of the genera just named which are not found in any of the species I have called *Anaxo*. *Synatractus* seems to be remarkable by the very elongate apical joint of its antennæ, and *Lisa* and *Ismarus* are both described as having very slender antennæ.

The sexual differences in *Anaxo* appear to be but slight, except in *A. ater* (whose sexual characters render its place in *Anaxo* doubtful); the males seem to be distinguished merely by smaller size and narrower form, by the intercoxal process of the basal ventral segment being somewhat elevated above the general plane of the segment, by a tendency to diminution of size on the apical joint of the antennæ, and (at least in some species) very slight differences in the apex of the last dorsal segment.

APELLATUS.

The species of this genus resemble each other very closely in general appearance, but have extremely strongly marked and distinctive sexual characters in the antennæ of the males (so far as I have seen). The following names have been applied to species appertaining to it :—*amœnus*, Pasc. (N. S. W.), formerly *lateralis*, Pasc., (nom. præocc.); *lateralis*, Bohem. (N.S.W.) (Euomma); *palpalis*, Macl. (Qu.); *Mastersi*, Macl. (Qu.); *apicalis*, Black. (W. Austr.).

I have before me three species, of two of them both sexes. The males differ from the females in the smaller size, in their very much longer palpi (the second joint very long and slender, the apical curved and very elongate-cultriform), in the closer approximation of their eyes, in the remarkable dilatation of some of the intermediate joints of their antennæ, in their more strongly arched tibiæ, and in the intercoxal process of the basal ventral segment being a little elevated anteriorly and not quite continuing the plane of the general surface of the segment.

It appears to me pretty certain that *A. amœnus*, Pasc., is a mere synonym of *lateralis*, Bohem., nor can I help thinking that Mr. Pascoe was mistaken in the opinion that he was describing the male. If it was the male, either the sexual characters of that species are very different from those of allied forms, or the author passed over unnoticed a very remarkable structure in the palpi. The description of the antennæ, moreover (subfiliform with the apical three joints a little shorter than the rest and somewhat compressed), seems suggestive of a female, although I should say that I have not seen an *Apellatus* of either sex whose antennæ quite present those characters. I conclude therefore that *A. lateralis*, Bohem. (lateralis, Pasc.—amœnus, Pasc.), is a species I have not seen of which it is doubtful whether the male is known.

I should say it is equally certain that *A. Mastersi*, Macl., is the female of *A. palpalis*, Macl. The colour differences of the two are of no account—the two species before me, of which I have both sexes, vary even more in colour. It is possible that *A. palpalis*, Macl., is the same as *A. lateralis*, Bohem., but this I think wants proof. One of the species before me may, I think, be Sir W. Macleay's insect (although its habitat in South Australia suggests doubt), but that author's description is not definite enough for certainty. If it be *palpalis*, I think it is probable that *palpalis* is distinct from *lateralis*, as the antennal structure in my examples does not quite agree with that of *lateralis*.*

I may add that the absence or presence of a slight pubescence on species of *Apellatus* is of no importance; very fresh specimens have a slight pubescence which is easily rubbed off.

A. apicalis, from Western Australia, is known only by a female, but it is at once distinguishable from the other *Apellati* by its different puncturation as well as different *style* of marking.

A. nodicornis, sp. nov. Leviter sparsim pubescens; testaceus vel rufo-testaceus, plus minusve infuscatus, lateribus apice (et nonnullis exemplis sutura) elytrorum nigris.

Maris antennarum articulo 7° fortiter dilatato; tibiarum posticarum parte apicali subito latiori et paullo ante apicem subdentata.

Feminæ antennarum articulis 3-10 inter se sat æqualibus. Long., 3—4½ l.; lat., ⅘ l.—1⅗ l.

The ordinarily coloured specimens are of bright rufo-testaceous

* Since writing the above I have examined the types of *A. palpalis* and *A. Mastersi* in the Macleay Museum. They are certainly male and female of one species, and are identical with the S. Australian species mentioned above. There are in the Macleay Museum also two examples labelled "*A. lateralis*, Pasc," and these also are identical with *A. palpalis*.

colour—the elytra pale testaceous-brown, with a blackish vitta commencing on each shoulder and gradually widening hindward till the two combine and fill up all the apex. The labrum and clypeus are deeply and pretty closely punctured, the back of the head and the prothorax finely and closely but not deeply. The prothorax has a wide impression down the middle and a small one close to the base on either side. The elytra are punctulate-striate, the interstices punctured.

This species is extremely like the S. Australian one referred to above, but differs from it in the male having all the joints 3-11 of the antennæ subparallel and but little compressed (8-10 shorter than the rest, 11 longer), except the seventh joint, which is strongly compressed and evidently arcuate, with its external apex produced in a short spine; joints 8-10 are a little narrower as well as shorter than 3-6, and 9-10 are a trifle narrower than 8; joint 3 is distinctly shorter than 4. In the female joints 3-11 are very uniform. The maxillary palpi of the male set back reach the prothorax.

Victoria; Alpine district; under bark of Eucalyptus.

A. nigricornis, sp. nov. Leviter sparsim pubescens; testaceus, prothorace rufescenti, antennis (basi excepta) palpis elytrorum lateribus sutura apiceque et abdominis lateribus apiceque nigris, tibiis tarsisque infuscatis.

Maris antennarum articulis 4-10 sat æqualibus minus fortiter compressis, apicali quam præcedentes longiori.

Femina latet. Long., 3 l.; lat., $\frac{4}{5}$ l.

This species scarcely differs from *A. nodicornis* except in its black antennæ and palpi and in the different structure of the male antennæ. The basal joint of the antennæ is red and the second reddish.

Victoria; Alpine district.

CHROMOMÆA.

C. maculicornis, sp. nov. Sat elongata; postice angustata; glabra; subnitida; ferrugineo-rufa; capite (labro excepto), mandibulis apice, antennis (articulis 1° 2° 3° 8' apice 9° 11' que apice exceptis), scutello, elytrorum basi sutura lateribus apiceque, prosterni medio, metasterni lateribus, femorum apice, tibiarum basi apiceque, et tarsis, nigris vel nigropiceis; capite fortiter sat crebre punctulato, oculis inter se remotis; prothorace quam latiori vix longiori, antice paullo angustato, ante basin fovea mediana elongata instructo, subtiliter sparsius punctulato, lateribus vix arcuatis, angulis posticis obtusis; elytris fortiter punctulato-striatis, interstitiis sat fortiter convexis sparsim subtiliter punctulatis. Long., $5\frac{1}{2}$ l.; lat., $1\frac{3}{5}$ l.

A species presenting an extremely intricate mixture of reddish ferruginous and black colouring, the black usually shading off vaguely into piceous and here and there inclining to reddish. It is probably allied to *C. pallida*, Bates, but differs not only in colour (especially in the variegated antennæ) but also in the puncturation of several parts, notably the interstices of the elytra which in Mr. Bates' species are said to be "rather closely punctured," while in the present species the punctures on the interstices are about as sparse as they could well be. The antennæ are somewhat slender, not at all serrate, the third joint not much shorter than the fourth and fifth together.

Victoria; in the collection of C. French, Esq.

C. rufipennis, sp. nov. Minus elongata; minus parallela; postice angustata; sat nitida; nigra, elytris rufis (margine summo laterali nigro) sat dense sericeo-pubescentibus; capite crassius crebrius punctulato; oculis inter se remotis; prothorace quam longiori vix latiori, antice paullo angustato, ante basin fovea mediana rotundata magna profunda instructo, sat crebre sat fortiter punctulato, lateribus vix arcuatis, angulis posticis fere rectis; elytris punctulato-striatis, interstitiis (alternis quam cetera magis fortiter) convexis crebre punctulatis.

A very distinct species, suggestive by its colours—and to some extent by its form—of some vars. of *Stenoderus suturalis*, Oliv. The antennæ are moderately stout, the intermediate joints a little dilated within so as to present a slightly serrated appearance; the third joint is considerably longer than the fourth.

Victoria.

PSEUDOCISTELA (gen. nov.).

Caput antice sat productum; mandibulæ apice acuminatæ, haud bifidæ; palporum maxillarium articulus secundus brevis robustus; apicalis latissime (fere ut *Metistetis*), labialium leviter, triangularis; oculi haud approximati; antennæ sat (vix minus quam *Anaxo*) robustæ sat elongatæ; prothorax transversus a basi antrorsum fortiter rotundatim angustatus; corpus ovale, alatum.

The little *Cistelid* for which I propose this name cannot, I think, be referred to any previously characterised genus. Its oval form distinguishes it from most, if not all, of the genera having the head produced into a beak, and the mandibles simply pointed. In Lacordaire's arrangement it would fall into the "groupe Cistelides vraies." The sexual differences seem to be very slight; the males are somewhat narrower and more attenuated behind, with the antennæ more slender (but scarcely longer) than those of the female, and the intercostal process of the hind body

slightly raised in front, the hind body itself being narrower and more convex transversely. The general facies is suggestive of *Cistela*.

P. ovalis, sp. nov. Sat nitida; ovalis; sparsim brevissime griseo- vel fulvo-pubescens; nigra, palpis antennarum basi tibiis anticis et unguiculis omnibus rufo-testaceis; supra crebre subtiliter sat profunde sat æqualiter punctulata; elytris prope suturam obsoletius striatis; corpore subtus subfortiter minus crebre punctulato.

Variat antennarum parte dimidia basali et pedibus totis (vel plus minusve), rufo-testaceis. Long., $2\frac{1}{5}$—$2\frac{1}{2}$ l.; lat., $\frac{4}{5}$—1 l.

The base of the prothorax is as wide as the base of the elytra; in the males the greatest width is in front of the middle of the elytra, which is very evidently, but not very much, wider than that of the base; in the females the elytra are evidently wider. and at their widest about the middle.

Victoria; Alpine district; on flowers.

HOMOTRYSIS.

The Australian *Cistelidæ* having bifid mandibles, described prior to 1866, were all referred by the authors to *Allecula* and *Cistela*. None of them, I think, were satisfactorily described (unless it be *Allecula fuscipennis*, Blessig), even Germar's descriptions being unreliable, because he placed in *Allecula* at least one species having simple mandibles; the rest are unrecognisable, unless the types be referred to. In 1866 (Journ. of Ent.) Mr. Pascoe very briefly characterised three new genera for this group of *Cistelidæ*—*Metistete*, *Homotrysis*, and *Hybrenia*. I think I have not seen either of the species their author placed in *Hybrenia*, but I am unable to regard the characters by which he distinguished them from *Homotrysis* as satisfactory, inasmuch as one of them (the approximation of the eyes) I find to vary considerably (and even sexually) among species that certainly seem incapable of being suitably placed in different genera, and the other (the close application of the prothorax to the elytra) seems to me to be presented by nearly all the Australian *Cistelidæ* of this group, even *H. microderes* (I have no doubt *Allecula fuscipennis*, Blessig), which Mr. Pascoe himself placed in *Homotrysis*, having the prothorax very closely fitted to the elytra, and the eyes considerably approximated in the male. I do not, of course, say that *Hybrenia* is not a good genus, only that the characters given to distinguish it from *Homotrysis* appear to me insufficient. As to *Homotrysis*, I take it to be a good genus, as the Australian species near *Allecula* seem to be unsuitably placed in the latter genus. *Metistete* also appears to be a good genus, its most distinctive character (not mentioned by its author) being

the absence of wings for flying. In 1879 Heer Haag-Rutenberg characterised two new genera for Australian *Cistelidæ*—*Lisa* and *Ismarus*—but without any statement whether they belong to the section with simple or apically bifid mandibles. The descriptions of these genera are most unsatisfactory (*e.g.*, implying that the maxillary palpi have only three joints, and in one place calling the labrum of *Ismarus* "abgerundet," and in another "gerade"). I am inclined to hazard a guess that *Ismarus* is a synonym of *Metistete*. *Lisa* is characterised at some length, but without the mention of any character that strikes me as really valuable for distinction among allied Australian forms, and the author at the end of his diagnosis remarks that the genus is distinguished by the large apical joint of its maxillary palpi, its "kissenartig gewölbte" prothorax, and its long legs and antennæ. I find some or all of these characters in species before me, but I am quite unable to regard them as generic, unless one makes a new genus for nearly every species of the group. In the description of the *species* on which *Lisa* is founded *(L. singularis)* there is, however, mention of two characters which appear to me much more likely to be workable for generic distinction than any of those the author calls generic. These are the presence of a dilatation in the middle of the inner margin of the front tibiæ (said to be a male character—probably correctly, I think) and of a foveate sulcus near the lateral margin of the elytra. I find each of these characters (apparently even in a more developed form than in the type) in several species before me, and *Allecula elongata*, Macl., presents the latter of them, but I have not seen them both in the same specimen—perhaps because I do not possess a male of a species having the elytral sulcus. I incline to think that the Australian species of the *Cistelidæ* allied to *Allecula* can be satisfactorily divided into genera only by their sexual characters, for which division our knowledge of species is as yet insufficient. My conclusion, therefore, is that the first genus characterised for them *(Homotrysis)* may stand as against *Allecula*, and I am able to point out that *Metistete* is apterous, and therefore distinguishable from *Homotrysis*, while it seems that the characters assigned to *Hybrenia* and *Ismarus* are shared by numerous forms incapable of being considered as strictly congeneric (although it is probable enough that when both sexes of a large number of Northern forms are known there may appear good reason for retaining those names and re-characterising them).

Among the *Cistelidæ* of this group in my collection there are several species that it would be quite impossible to associate with any of the genera mentioned above on account of complete difference in facies, although I have not been able to satisfy

myself of the existence of structural characters that could be relied upon as generically invariable. These are of oval form, and are much less elongate than any of the above mentioned genera, their shape being suggestive of *Harpalus* and in some cases of *Choleva*, while *Hybrenia*, &c., approximate more to the appearance of *Telephorus*, or *Tenebrio*. I have spent some time in examining these insects in search of a workable method of *defining* this distinction provisionally until the comparison of both sexes of a large number of species be possible (which will probably lead to a much more scientific diagnosis), and have found that this difference in facies seems reliably associated with a difference in the comparative length of the femora and width of the body. In *Homotrysis*, *Hybrenia*, &c., the hind femora, if laid out at right angles to the central longitudinal line of the body, extend by at least a third of their length beyond the external margin of the elytral epipleuræ, while in these more oval forms the projecting piece of the femora similarly placed is much shorter. In these latter, also, the head, as compared with the prothorax is very much narrower. I find it necessary to characterise two new genera for them, as there are two very distinct types among them differing in the general facies and in the structure of the femora. I divide the Australian genera of *Cistelidæ* with bifid mandibles as follows:—

A. Hind femora much longer than the distance from their base to the external margin of the elytral epipleuræ.
  B. Apterous ... ... Metistete
  BB. Winged ... ... Homotrysis
AA. Hind femora little (or scarcely) longer than the distance from their base to the external margin of the elytral epipleuræ.
  B. Tibial depression beneath femora very long. Facies of *Harpalides* ... ... Scaletomerus
  BB. Tibial depression beneath femora much shorter. Facies of *Choleva* or *Platydema* Nocar

Homotrysis (as I regard it) has been subdivided thus (assuming Haag-Rutenberg's species to have mandibles bifid at the apex):—

A. Apical joint of maxillary palpi of ordinary size.
  B. Eyes approximate. Prothorax closely applied to elytra ... ... Hybrenia
  BB. Eyes more distant. Prothorax less closely fitted to elytra ... ... Homotrysis
AA. Apical joint of maxillary palpi very large ... Lisa

Finding myself unable (as already pointed out) to determine to which of *Hybrenia*, *Homotrysis*, and *Lisa* should be referred

certain of the species before me, which certainly belong to *Homotrysis* under the former of the above tabulations, I have thought it best to disregard for the present these two unsatisfactory *generic* names, and to call *Homotrysis* all the species that would be referred to it by the former of the above two tabulations.

The following is a tabulation of the species described below, together with two or three other species introduced for the sake of comparison :—

A. Interval between eyes less (at least in the male) than the width of either eye as seen from above.
  B. Upper surface densely clothed with erect pilosity.
    C. Punctures of elytral striæ scarcely distinct, those of the interstices very conspicuous.
      D. Legs and antennæ entirely testaceous or rufo-testaceous.
        E. Elytra with well-defined dark piceous markings ... ... limbata, Blackb.
        EE. Elytra uniformly rufous ... rufa, Blackb.
      DD. Legs and antennæ obscure... fusca, Blackb.
    CC. Punctures of elytral striæ very conspicuous, interstices nearly lævigate, though granulated behind ... ... rugulosa, Boisd.
  BB. Upper surface not clothed with dense erect pilosity, uniformly coloured
    C. Elytra somewhat evenly sculptured.
      D. Elytra black or bluish.
        E. Size large (long. about 6 l. or more).
          F. Front part of elytral striæ punctured conspicuously, and with much larger punctures than the interstices ... nitida, Blackb.
          FF. Elytral striæ in front (especially near suture) punctured scarcely differently from the interstices tenebrioides, Blackb.
        EE. Size small (long. about 4 l. or less)
          F. Antennæ, tibiæ, and tarsi testaceous red ... ruficornis, Blackb.

FF. Antennæ, tibiæ, and tarsi black	lugubris, Blackb.
DD. Elytra fulvous brown ...	fulvipennis, Blessig.
CC. Elytra in front with a deep foveate sulcus near the margin	princeps, Blackb.
BBB. Upper surface with markings composed of pale pubescence...	maculata, Haag-Rut
AA. Interval between eyes in both sexes greater than the width of either eye as seen from above ...	carbonaria, Germ.

HOMOTRYSIS.

H. maculata, Haag-R. In my collection there are three examples (from the N. Territory) which must be referred, I think, to this species, which was described on a specimen from Cape York, and seems to be a very variable insect, as no two of the three are quite identical with each other. One of them is nearly black, and has a strong tooth on the inner margin of the front tibiæ (being probably a male). The other two are coloured in accordance with the description; one of them, however, has the elytra much more roughly sculptured than the other and than the type (according to description), and is considerably more parallel, and may perhaps represent a distinct species (it is very much broken, unfortunately), but the pubescent markings on the upper surface of this species are so peculiar that it seems hardly likely two species exactly possessing them should occur in the same locality. The principal difficulty of identification consists in Haag-Rutenberg describing the under surface as "vix punctatum," whereas in all three of my specimens it is very distinctly punctured. I think the author must have made a mistake in this character, as it seems hardly probable that a surface clothed with strong hairs should not be punctulate.

H. carbonaria, Germ. I have lately observed that Haag-Rutenberg mentions his having seen the type of this species, and also of *H. tristis*, Germ., and does not speak of their being identical. Nevertheless, I adhere to the opinion I have already expressed, that *H. carbonaria* is the male, and *H. tristis* the female, of one species. At any rate, all the examples I have seen agreeing with the description of each are of the sexes just named. The males have the eyes evidently more approximated than the females, and, owing to the narrowness of the hind body, the sides of the elytra extending beyond it, appear in certain lights to have a fuscous margin, the existence of which I believe was by a careless observation stated by Germar to constitute a variety. The undersurface of the elytra is of a fuscous colour. In *H. fuscipennis*, Blessig, I find a similar sexual difference in the pilosity of the prothorax.

H. lugubris, sp. nov. Elongata, sat parallela; minus convexa; sat nitida; sparsim obscure griseo-pubescens; atra, antennis pedibusque picescentibus, unguiculis testaceis; capite sparsim fortiter punctulato, oculis sat approximatis; prothorace quam longiori plus quam sesquilatiori, vix perspicue (ante basin profundius) canaliculato, ante basin utrinque manifeste impresso, fortius sat crebre punctulato, a basi antrorsum sinuatim angustato, basi leviter bisinuata quam margo anticus sat latiori, angulis posticis fere rectis apice summo rotundatis, elytris crebre fortius punctulatis, fortiter striatis, interstitiis transversim rugatis; corpore subtus sparsius (abdomine magis sparsim) punctulato; antennis quam corporis dimidium sat longioribus, articulo 3° quam 1^us^ duplo (quam 4^us^ paullo) longiori. Long., 3⅘ l.; lat., 1⅕ l. (vix).

I believe the specimen before me to be a male, on account of the intercoxal process of the hind body being strongly elevated above the general plane of the basal segment; the hind body being wider and less convex transversely than is usual in males of this genus suggests a doubt, however.

Placed beside *H. carbonaria*, Germ., this species is considerably smaller, and is devoid of erect hairs, except on the front part of the head; it is considerably narrower, more parallel, and less convex; the head is much less closely punctured, the eyes are evidently more approximate, the surface of the prothorax is differently impressed, and a little less closely punctured, with hind angles more tending to be prominent laterally; the elytra are less nitid, and more finely and closely punctured and wrinkled; the third and fourth joints of the antennæ are relatively shorter, and the whole antennæ are more slender.

The narrow form, slight convexity, absence of erect pilosity, somewhat different antennæ, and absence of a fovea on the apical ventral segment suggest the probability of this species being eventually separated generically from *H. carbonaria*, but I do not think it can be referred to any genus yet characterised as distinct from *Homotrysis*.

Victoria; Alpine district.

H. ruficornis, sp. nov. Elongata; sat parallela, minus convexa; minus nitida; pilis fulvis brevibus suberectis obscure vestita; nigra, ore labro palpis antennis tibiis tarsisque testaceo-rufis; capite prothoraceque subtilius sat crebre punctulatis; oculis sat approximatis; prothorace (puncturatione excepta) ut *H. lugubris;* elytris confertim subtilius punctulatis, sat fortiter striatis, interstitiis vix perspicue transversim rugatis; corpore subtus sat crebre subfortiter (abdomine multo minus fortiter) punctulato; antennis (colore excepto) ut *H. lugubris*. Long., 4 l.; lat., 1⅘ l.

Very near the preceding in all structural characters, but very different in colouring and sculpture, the prothorax being much more closely punctured, the elytra more finely and closely punctured and more feebly striated, &c. The eyes are somewhat larger, and still more approximated, the interval between them being only about half as wide as the width of either eye looked at from above; this may be sexual, but I find no decided character to indicate the sex of either species, and incline to think that both examples are males.

Queensland; sent from Brisbane by F. M. Bailey, Esq.

H. rugulosa, Boisd. (?). Modice elongata; sat parallela; minus convexa; nitida; pilis elongatis erectis sat crebre vestita; fusca, capite et corporis subtus partibus nonnullis fere nigris, elytrorum sutura rufa; capite sat sparsim minus crebre punctulato, oculis modice approximatis; prothorace quam longiori fere dimidio (postice quam antice haud multo) latiori, sparsim fortiter punctulato, late leviter canaliculato, ante basin utrinque impresso, lateribus modice arcuatis, basi leviter bisinuata, angulis posticis leviter obtusis; elytris vix striatis, potius puncturis sat magnis seriatim ornatis, interstitiis sat planis sparsim seriatim punctulatis postice subrugulosis; antennis quam corporis dimidium longioribus; articulo 3° quam 4^us^ paullo breviori; corpore subtus sparsim minus fortiter punctulato, segmento ventrali apicali plus minusve profunde impresso.

Maris quam feminæ antennis longioribus, paullo magis compressis (exempli typici articulis 9-11 carentibus). Long., 2⅘ l.—3⅗ l.; lat., ⅘ l.—1 l.

This species has much resemblance to the preceding, but is at once distinguishable from all its allies known to me by the long erect pilosity with which it is clothed and the brightly nitid very thinly punctured interstices of its elytral striæ, which become a little uneven and transversely rugulose towards the apex. The interval between the eyes is much less in both sexes than the width of either eye as seen from above. Unless the type of *Allecula rugulosa*, Boisd., can be referred to it will be impossible to identify any species with it except doubtfully, as the description (of eight words) is quite insufficient, but the colour and pilosity, as mentioned, agreeing with the specimens before me, and being unusual in the genus, and the species before me being a widely distributed one, is very likely to be what Boisduval described.

S. Australia and Victoria.

H. limbata, sp. nov. Sat elongata; modice parallela, antice posticeque angustata; minus convexa; nitida; pilis minus

brevibus sat dense vestita; rufa, elytris ad latera vitta picea ab humeris retrorsum gradatim latiori ornatis; capite fortiter sat crebre punctulato; oculis sat approximatis; prothorace quam longiori parum latiori, fortiter minus crebre punctulato, haud vel vix canaliculato, ante basin in medio late leviter utrinque oblique sat fortiter impresso, abasi antrorsum sinuatim angustato, basi bisinuata, angulis posticis subacutis vix extrorsum directis; elytris sat fortiter sat crebre punctulatis, punctulato striatis, puncturis in striis et in interstitiis inter se sat æqualibus; antennis quam corporis dimidium paullo longioribus, articulo 3° quam 4^us^ subbreviori; corpore subtus sat fortiter punctulato. Long., $3\frac{3}{5}$—$4\frac{1}{5}$ l.; lat., 1—$1\frac{1}{5}$ l.

The sexual differences in this species seem very slight. The hind-body of the male is much narrower and more convex transversely than that of the female, and the eyes in the same sex are perhaps a trifle more approximated; in both sexes the interval between the eyes is very much less wide than either eye as seen from above. The colours and markings of this species are considerably like those of an *Apellatus*. The vitta on each elytron dilates hindward to the extent of filling up the apical portion but (in all the examples I have seen) leaves the suture and margin narrowly red.

Victoria; Alpine district.

H. rufa, sp. nov. Modice elongata; sat parallela; sat convexa; minus nitida; pilis erectis sat brevibus densius vestita; rufa, antennis pedibus abdomineque plus minusve dilutioribus, nonnullis exemplis capite obscuriori; hoc fortiter sat crebre punctulato; oculis subapproximatis; prothorace quam longiori fere sesqui latiori, late vix perspicue canaliculato, ante basin utrinque obscure impresso, crebre fortiter punctulato, antice quam postice paullo angustiori, lateribus sat rotundatis, basi leviter bisinuata, angulis posticis obtusis; elytris crebre subfortiter punctulatis, leviter striatis; antennis quam corporis duæ partes paullo longioribus, articulis 4-10 (præsertim 4) leviter compressis intus subserratis, 3° quam 4^us^ paullo breviori; corpore subtus sparsim minus fortiter punctulato, segmento ultimo ventrali late longitudinaliter impresso. Long., $3\frac{3}{5}$ l.; lat., 1 l.—$1\frac{1}{5}$ l. (vix).

A puzzling species, very unlike *H. carbonaria*, Germ., but in almost every point of difference connected with it by intermediate species. The third antennal joint shorter than the fourth (for example) is certainly suggestive of generic distinction, but this insect cannot, I think, be separated generically from *H. fusca*, in

which the proportion of the third and fourth joints is reversed. The interval between the eyes is considerably less than the width of either eye as seen from above. The apical joint of the antennæ is considerably longer than the tenth. The sexual distinctions seem very slight; in the male the intercoxal process of the hind body is conspicuously elevated. The metasternum is extremely tumid, and is in many examples considerably darker in colour than the hind-body.

S. Australia; near Adelaide.

H. tenebrioides, sp. nov. Elongata; sat parallela, pone medium subdilatata; modice convexa; sat nitida; pilis brevibus erectis sparsim obscure vestita; cœruleo-nigra, prothorace læte cyaneo-micans, sutura obscure rufescenti, labro palpis et antennarum apice plus minusve testaceis, pedibus picescentibus; capite crebrius sat fortiter punctulato; oculis sat approximatis; prothorace fere subgibboso, leviter transverso, sparsius sat fortiter punctulato, a basi antrorsum sat fortiter rotundato-angustato, lateribus ante basin leviter sinuatis, dorso antebasin transversim 3-foveolato, basi bisinuato, angulis posticis rectis leviter extrorsum prominulis; elytris crebre sat fortiter punctulatis, sat fortiter striatis, interstitiis transversim rugulosis; antennis ut *H. lugubris*.

Maris tibiis anticis infra basin intus angulatim dilatatis. Long., $6\frac{1}{2}$ l.; lat., $2\frac{1}{5}$ l.

A handsome and distinct species of facies suggestive of *Tenebrio*.

South Australia; basin of Lake Eyre.

H. princeps, sp. nov. Elongata; subparallela, postice acuminata, sat convexa; minus nitida; pilis brevibus suberectis sparsim obscure vestita; cœruleo-nigra, prothorace læte cyaneo-micans; capite sparsius fortius punctulato; oculis approximatis; prothorace fere ut *H. lugubris* sed margine antico bisinuato in medio manifeste rotundato-producto, sparsim fortiter punctulato; elytris sat fortiter sparsius punctulatis, subtiliter striatis, striis subtiliter punctulatis, interstitiis perplanis, margine laterali pone humeros antice profunde sulcato, sulco foveis magnis profundis instructo; antennis fere ut *H. lugubris* sed articulo 3° magis elongato. Long., $8\frac{1}{2}$ l.; lat., 3 l.

I do not find any character decisively indicating the sex of my example of this fine species, which probably points to its being a female, as it is probable that the anterior tibiæ of the male are toothed within. The extremely fine striæ of the elytra, their punctures much finer than those of the interstices, and the absolute flatness of the interstices, together with the remarkable

sulcus with its large foveæ on the sides of the elytra, render this a very distinct insect. It is perhaps just possible (but I think very improbable) that this is a var. of *(Allecula) elongata*, Macl. It is also near *Lisa singularis*, Haag-R., which, however, *inter alia*, has the prothorax "sat dense punctatus."

N. Territory of S. Australia.

H. nitida, sp. nov. (Mas.). Elongata; subparallela, postice sat acuminata; sat convexa; nitida; pilis sat elongatis erectis sparsim vestita; nigra, vix cyaneo-micans, labro antice ferrugineo; capite sat crebre sat fortiter punctulato, oculis subcontiguis; prothorace leviter transverso, subquadrato, a basi antrorsum leviter arcuatim angustato, sparsim sat fortiter punctulato, fere subgibboso, ante basin transversim 3-impresso (impressione media minus perspicua), margine antico bisinuato in medio sat fortiter rotundato-producto, angulis posticis subrectis extrorsum vix prominulis; elytris leviter striatis, striis punctulatis (puncturis anticis sat magnis subquadratis retrorsum gradatim obsoletescentibus), interstitiis sat planis sparsim punctulatis; antennis (exempli typici) carentibus, sinedubio fere ut feminæ, sed paullo magis elongatis; tibiis anticis inmedio intus rotundatim dilatatis. Long., 7 l.; lat., 2 l.

Feminæ oculis paullo minus approximatis, prothorace paullo magis crebre punctulato, tibiis anticis simplicibus, antennis quam corporis dimidium vix longioribus, articulo 3° quam 4^{us} sat longiori; corpore (? abraso) haud piloso. Long., 8 l.; lat., 3 l.

The antennæ (of the female) are in every respect extremely like those of the same sex of *H. carbonaria*, Germ. The punctures in the striæ on the elytra are much larger than those of the interstices.

N. Territory of S. Australia.

H. fusca, sp. nov. Sat elongata; sat parallela; sat nitida; pilis brevibus erectis densius vestita; fusca, elytris suturam versus tibiis tarsisque plus minusve rufescentibus; capite sat crebre fortiter punctulato; oculis approximatis; prothorace quam longiori plus quam sesquilatiori, antice quam postice vix angustiori, quam caput parum latiori, late leviter canaliculato, ante basinutrinque impresso, crasse sparsim punctulato, lateribus leviter arcuatis ante basin bisinuatum subsinuatis, angulis posticis rectis; elytris sat crasse minus crebre punctulatis et subtiliter punctulato-striatis; antennis quam corporis duæpartes vix brevioribus, articulo 3° quam 4^{us} sequentesque parum longiori; segmento ventrali apicali fovea mediana instructo; corpore subtus sparsim punctulato. Long., $3\frac{3}{5}$ l.; lat., $1\frac{1}{5}$ l.

Notable for the generally coarse character of the puncturation, which is at its maximum on the prothorax. The striæ on the elytra are punctulate, but their punctures are little conspicuous, being not much different in character from those of the general surface. I suspect my two examples are both males, and it is probable that the apical ventral segment in the female is less conspicuously foveated.

S. Australia; near Port Lincoln.

BARYCISTELA (gen. nov.).

Caput breve; mandibulæ apice bifidæ; palporum maxillarium articulus secundus robustus quam tertius duplo longior, apicali longitudine sat æqualis; hoc magnus triangulum æquilaterum formans, labialium forma similis sed minor; oculi (maris?) parum approximati; antennæ elongatæ sat graciles, articulus 3^{us} quam 4^{us} paullo brevior; prothorax fortiter transversus, quam elytra vix angustior basi subbisinuatus; femora subtus sulco elongato impressa; tibiæ anticæ apice extus dilatatæ; suturæ ventrales apicales 2 valde impressæ ad latera sat fortiter retrorsum directæ; prosternum inter coxas valde elevatum; corpus robustum, latum, alatum.

Agreeing with *Homotrysis* in the possession of the characters that would entitle to a place in *Allecula*, as tabulated by Lacordaire (viz., short bifid mandibles, head free in repose, anterior coxæ not contiguous, tarsi lamellated, &c.), this genus differs from *Homotrysis* (including *Hybrenia* and *Lisa*) by its totally different build, which is very exceptionally robust for the family, recalling somewhat the appearance of *Dascillus*; also by the extremely strong and abrupt elevation of the hind part of the prosternum, which is considerably more marked than in *Homotrysis tristis*, Germ., in the very much longer sulcus running inward from the apex on the underside of the femora, much shorter third joint of the antennæ, &c. From *Nocar* it differs, *inter alia*, by its much more robust and parallel form, the hind part of the prosternum very much more elevated, &c.; from *Scaletomerus* by the last of the characters just named, by greater robustness, very different apical joint of maxillary palpi, prothorax scarcely narrower than the elytra, &c.; and from all the above by its anterior tibiæ dilated externally at the apex, this latter character approximating the present genus to the Hawaiian *Labetis*, to which it really bears a good deal of resemblance, though differing in important characters (*e.g.*, the structure of the palpi and femoral sulci). The example before me has lamellæ on the third and fourth joints of the front tarsi and the fourth of the intermediate, but not a well-defined one on the hind tarsi.

B. robusta, sp. nov. Minus nitida; modice convexa; sat lata; sat parallela; sparsim breviter pubescens; obscure rufo-brunnea, metasterno medio picescente, antennis palpis pedibusque dilutioribus; capite brevi rugulose sat crasse punctulato; prothorace quam longiori fere duplo latiori, antice parum angustato, postice ante basin utrinque impresso, confertim aspere punctulato, lateribus sat rotundatis, angulis anticis nullis plane rotundatis, angulis posticis suberectis; elytris subfortiter minus crebre punctulatis, subtiliter striatis; sternis fortiter minus crebre (prosterni lateribus crasse rugulose), abdomine sparsim subtiliter, punctulatis.

Maris (?) antennis quam corporis dimidium longioribus. Long., 4 l.; lat., $1\frac{1}{3}$ l.

It is impossible to be certain that this may not be one of the numerous Australian species attributed to *Allecula*, and described in a few words, without reference to structural characters. The brief description of *A. Mastersi*, Macl., for example, might possibly be founded on it.

Queensland; sent by F. M. Bailey, Esq.

NOCAR (gen. nov.).

Caput antice sat breve; mandibulæ apice bifidæ; palporum maxillarium articulus secundus sat brevis; apicalis late, labialium minus late, triangularis; oculi magni modice approximati; antennæ sat graciles modice elongatæ, articulus 3^us^ quam 4^us^ vix longior; prothorax fortiter transversus, a basi antrorsum fortiter rotundatim angustatus, basi bisinuatus; corpus ovale, alatum; suturæ ventrales apicales 2 ad latera subito valde retrorsum directæ.

This new generic name is necessary to distinguish certain small *Cistelidæ* which agree with *Homotrysis* in the possession of wings, mandibles bifid at the apex, lamellated tarsi, widely triangular apical joint of maxillary palpi, &c., but differ very much in form, being oval, the four posterior femora scarcely long enough to extend laterally beyond the margin of the elytra. The eyes are larger and more approximate than in the typical *Homotrysis* (*H. tristis*, Germ.), the third joint of the antennæ is relatively shorter, the head is very much smaller in comparison of the other parts, being less than half as wide as the base of the prothorax; the general surface is only slightly nitid, and is clothed with very fine adpressed pubescence—not erect pilosity; and the apical ventral segment does not bear a fovea. Joints 3-11 of the antennæ are of very uniform length, joints 3 and 4 being only a little longer than the rest.

From *Allecula* and *Cistela* this genus is distinguished, *inter alia*,

by the comparatively approximate eyes (the interval between which is much less than the width of each eye as seen from above) and the strongly bisinuate base of the prothorax.

The species which I described as *Cistela australica* (Proc. L. Soc., N.S.W., 1888, p. 1,441), in the collection made in the N. Territory by Mr. J. P. Tepper, appears to belong to this genus, though its condition does not allow a very satisfactory examination of all details. The genus is very near *Cistela*, but I think the characters mentioned above (especially the first) together with the distinct lamella under the penultimate joint of each tarsus justify its separation.*

N. latus, sp. nov. Convexus; sat late ovalis; supra minus nitidus; pube fulva vestitus; obscure brunneus vel rufus, antennis palpis pedibusque plus minusve dilutioribus; capite prothoraceque confertim aspere sat fortiter punctulatis; hoc quam longiori vix duplo latiori, basi fortiter bisinuata quam margo anticus duplo latiori quam elytrorum basis haud angustiori, angulis posticis acutis leviter retrorsum directis; elytris sat crebre subfortiter punctulatis, punctulato-striatis, interstitiis subconvexis, lateribus sat arcuatis; corpore subtus nitido sparsim punctulato, exemplis nonnullis piceo-maculato. Maris oculis quam feminæ paullo magis approximatis. Long., $3\frac{1}{2}$ l.; lat. $1\frac{1}{2}$ l.

I judge from the brief description of *Allecula Mastersi*, Macl., that it is a member of this genus, and very nearly allied to this species. As, however, its habitat is very different (Gayndah, Qu.), and the description does not agree altogether with the S. Australian form (calling the pubescence "semi-erect," and the tarsi differently coloured from the tibiæ), I have little doubt of its distinctness.

S. Australia and Victoria; under bark of Eucalyptus.

N. debilis, sp. nov. Præcedenti valde affinis, sed minor, minus latus, antennis apicem versus infuscatis fere nigris, elytrorum striis apicem versus obsoletis; corpore subtus magis crebre magis fortiter punctulato. Long., $2\frac{2}{5}$ l.; lat., 1 l.

Certainly very close to *T. latus*, but the characters mentioned above, its uniformly smaller size, narrower form, elytral striæ almost entirely failing near the apex (in *T. latus* they are almost deeper near the apex than elsewhere), and the evidently stronger

* Since writing the above I have examined the types of various *Cistelidæ* in the Macleay Museum. I find that *Cistela depressiuscula*, Macl., is certainly congeneric with my *Nocar latus* and is extremely close to it specifically. Unfortunately I had not an example of *N. latus* with me, so could not compare the two to determine whether they are specifically distinct.

and closer puncturation of the underside are evidently distinctive of a species.

S. Australia; Yorke's Peninsula, under bark of Eucalyptus.

N. simplex, sp. nov. *T. lato* affinis, sed minor, multo minus late (quam *T. debilis* minus late) ovalis, pedibus antennisque magis obscuris, oculis multo minus approximatis, elytris haud striatis, prosterni episternis fortiter rugulosis. Long., $2\frac{1}{4}$ l.; lat., $\frac{9}{10}$ l.

The distance between the eyes is a little greater than the width of either eye as seen from above (probably the eyes of the male are a little more approximated). The non-striated elytra (even the juxta-sutural stria being scarcely indicated) at once distinguish this species, which has a facies suggestive of *Choleva*.

S. Australia; taken by Mr. McDougal near Edithburgh.

SCALETOMERUS (gen. nov.).

Caput paullo elongatum; mandibulæ apice bifidæ; palporum maxillarium articulus secundus tertio sesquilongior apicali longitudine æqualis; hic sat late securiformis, labialium sat late triangularis; oculi maris modice feminæ parum approximati; antennæ modice robustæ, minus elongatæ, articulus 3^{us} quam 4^{us} longior; prothorax sat transversus, basi leviter bisinuata; corpus alatum minus elongatum; femora subtus sulco elongato impressa; suturæ ventrales apicales 2 valde impressæ ad latera subito valde retrorsum directæ; facie *Harpalides* simulans.

The apical joint of the maxillary palpi is elongate, but not nearly so narrow as that of *Anaxo*, the longest of its three sides being that which continues the external outline of the palpus. The resemblance to a *Harpalid* is very striking. The head is evidently more prolonged in a beak than that of *Nocar*.

S. harpaloides, sp. nov. Nitidus; modice elongatus; minus convexus; glaber; rufo-testaceus, elytris (sutura excepta) abdomineque infuscatis; capite prothoraceque subtilius minus crebre punctulatis; hoc quam longiori sesquilatiori, postice quam antice sat latiori, vix perspicue canaliculato, lateribus modice arcuatis, basi bisinuata, angulis posticis subacutis, retrorsum vix subproductis; elytris subtiliter striatis, striis sat subtiliter sat crebre punctulatis, interstitiis vix planis subtilius sparsim punctulatis; antennis elytrorum basin paullo superantibus; corpore subtus (præsertim abdomine) sublævigato.

Maris oculis sub approximatis; tibiis anticis intermediisque in medio intus sinuato-dilatatis; segmento ventrali apicali excavato. Long., 3 l.; lat., $1\frac{1}{5}$ l. (vix).

S. Australia; MacDonnell Ranges.

S. proximus, sp. nov. Præcedenti valde affinis; capite prothoraceque piceis, prothoracis angulis posticis paullo minus acutis; maris tibiis simplicibus, segmento apicali ventrali sat leviter impresso. Long., 3 l.; lat., $1\frac{1}{3}$ l. (vix).

The present species might well pass for a dark form of the preceding, were it not for the different male characters, which are almost confined to the somewhat closer approximation of the eyes, the tibiæ being quite like those of the female, and the apical ventral segment being only lightly impressed, instead of bearing a large deep round fovea.

S. Australia; basin of Lake Eyre.

HEMICISTELA (gen. nov. ? hujus fam.).

Caput sat breve; mandibulæ apice acuminatæ (?); palporum maxillarium articulus secundus robustus quam tertius paullo longior, apicali longitudine parum brevior; hic sat magnus securiformis, labialium obovatus, vix triangularis; oculi (maris ?) inter se sat distantes; antennæ modice robustæ quam corporis dimidium vix longiores, articulo 3° quam 4^us^ paullo breviori; prothorax sat transversus, quam elytra sat angustior, basi haud bisinuata; femora subtus sulco minus elongato impressa; tibiæ intermediæ (? maris solum) intus ante apicem emarginata; prosternum inter coxas haud elevatum, his illum sat fortiter superantibus; unguiculis vix manifeste pectinatis; corpus oblongo-ovale.

The species for which I propose this name is a very puzzling one which does not appear to me to fit quite satisfactorily into any known family. It has very decidedly the general appearance of a *Cistelid*, and I think the possession of the following characters in combination will justify its being placed among the *Cistelidæ*, viz., tarsi heteromerous, and furnished beneath with well-defined *lamellæ* (two on each of the four anterior, and one on the posterior), anterior coxal cavities closed behind. Nevertheless the claws are not distinctly pectinated within (under a microscope the inner outline seems to be finely crenulated), and the prosternal process, instead of being elevated to the level of the coxæ, passes between the coxæ on the general plane of the surface, the coxæ rising (but not very strongly) above its plane on either side. The apical spines of the tibiæ are very short and slender. The singular emargination of the intermediate tibiæ close to the apex of the inner margin is very likely to be sexual. The penultimate ventral segment is about the same size as that preceding it. The apical joint of the maxillary palpi is much like that of *Homotrysis tristis*, Germ., in shape, but is relatively smaller.

My unique type of this insect has its mandibles tightly closed together, so that I have been unable to examine them as exactly

as I could wish. I can only see *one* apical joint, but from the shortness of the head, and the evident resemblance in most characters to genera with bifid mandibles rather than to *Atractus* and its allies, I cannot help thinking it probable that this species really has bifid mandibles.

H. discoidalis, sp. nov. Subnitida; minus convexa; oblongo-ovalis; fere glabra; testacea, capite postice palporum apice antennis (basi excepta) prothoraceque rufo-infuscatis, elytris (plaga magna elongata discoidali utrinque livida excepta) abdominisque parte apicali nigris; capite prothoraceque subcoriaceis minus crebre leviter punctulatis; hoc sat transverso antice vix angustato, medio ante basin foveato; elytris punctulato-striatis, interstitiis sat planis sparsim sat fortiter punctulatis, striarum punctis quadratis sat crebris. Long., 2 l.; lat., $\frac{7}{10}$ l.

The livid patch on each elytron nearly reaches the base, but does not extend hindward much beyond the middle, and is somewhat narrowed from the base hindward. The size, color, and markings give this little species some resemblance to a *Lebiid* (*e.g.*, *Ectroma civicum*, Newm.).

Victoria; Alpine district; a single example under bark.

PYTHIDÆ.

The genus characterised below as *Trichosalpingus*, though much like *Salpingus* in form, is really an extremely anomalous type which will not fit exactly into any family as characterised by M. Lacordaire. It agrees with the *Pythidæ* in the following characters:—Front coxæ contiguous, but little exserted and open behind, hind coxæ separated and strongly transverse, eyes lateral entire, pronotum much narrower than the elytra at its base, not separated from the flanks of the prosternum, prosternum truncate in front; but it differs in the structure of its tarsi, the penultimate joint of which is prolonged beneath the claw-joint, while the claws are strongly thickened at the base.

Some one or more of the above-mentioned characters are inconsistent with a place in any other of the known families of *Heteromera*.

TRICHOSALPINGUS (gen. nov.).

Mentum transversim subquadratum; palporum articulus ultimus ovalis; genæ (?) subtus spiniformes; oculi sat magni prominentes sat fortiter granulati; caput sat breve antice late breviter rostriforme (fere ut *Salpingi*); antennæ breves subfiliformes; prothorax sat quadratus; elytra sat elongata; pedes breves, femoribus tibiisque fere ut *Salpingi*; tarsi heteromeri, articulo penultimo subtus producto, posticorum

articulo 1° quam 4^us^ sat longiori; unguiculi ad basin incrassati; prosterno antice truncato; corpus subtiliter pubescens.

T. brunneus, sp. nov. Oblongo-ovatus; minus nitidus; subtiliter pubescens; crebre (capite minus crebre subtiliter subaspere) punctulatus; obscure brunneus, capite prothorace antennis palpis pedibus abdomineque rufescentibus; antennis prothoracis basin vix attingentibus; prothorace quam caput vix latiori, sat transversim quadrato, ante basin utrinque fovea profunda impresso; elytris quam prothorax basi multo latioribus, a basi longe ultra medium leviter dilatatis. Long., 2 l.; lat., $\frac{3}{4}$ l.

Victoria; Alpine district.

NOTOSALPINGUS (gen. nov.).

Generi præcedenti differt genis haud spiniformibus, oculis multo minoribus, capite antice manifeste magis rostriformi, antennis apicem versus paullo incrassatis (nec clavatis), prothorace (speciei typicæ) cordiformi, tarsorum articulis (apicali excepto) brevibus, penultimo quam præcedentes multo angustiori haud subtus producto, articulis basalibus subtus hirsutis, corpore fere glabro capillis erectis sparsim vestito.

I think this genus will be sufficiently distinguished from those previously characterised in the family by its head resembling that of *Salpingus*, in combination with tarsi of which the apical joint is as long as all the rest together, the penultimate much narrower than the preceding joints, and the first not much longer than the second, and antennæ not clavate.

N. ornatus, sp. nov. Elongato-ovalis; sat nitidus; fortiter minus crebre (capite sat crebre) punctulatis; brunneus vix æneus cens, piceo-umbratus, elytris testaceo-variegatis, palpis antennarum basi pedibusque plus minusve testaceis; prothorace transverso, ab apice retrorsum sinuatim angustato, lateribus sparsim obscure denticulatis; capite quam prothorax paullo, hoc quam elytra magis quam paullo, angustioribus. Long., $\frac{4}{5}$—$1\frac{1}{5}$ l.; lat., $\frac{3}{10}$—$\frac{4}{5}$ l.

The base of the prothorax is testaceous. The testaceous markings on the elytra consist of a wide vitta commencing on each shoulder and running towards the suture, which it nearly but not quite reaches at about a quarter the length of the latter from the scutellum; at that point it becomes much narrower, and continues parallel with the suture to about the middle of the length of the elytra, where it abruptly dilates and ends; there is also an indistinct testaceous blotch on each elytron near the apex. The above described testaceous markings are fairly

(in some examples very) well defined ; the rest of the surface has a mottled appearace owing to the brownish colour being here and there obscurely darker or lighter. The punctures on the elytra have a very evident tendency to run in rows.

The antennæ do not quite reach back to the base of the prothorax ; their joints do not differ much *inter se*, but the first four are evidently more slender than the rest, and the apical four or five again show a slight increase in stoutness.

S. Australia ; near Port Lincoln ; under bark of Eucalyptus.

NEOSALPINGUS (gen. nov.).

A. Trichosalpingo differt fere ut præcedens sed antennarum articuli ultimi 3 clavam abruptam formant.

This genus differs from *Notosalpingus* very much as *Lissodema* differs from *Salpingus;* from *Lissodema* it is at once separated by its very different tarsi, which are shorter and stouter, with the apical two joints conspicuously more slender than the rest, which are densely clothed beneath with long hairs, the basal joint of the hind tarsi being scarcely longer than the second.

N. corticalis, sp. nov. Oblongo-ovatus ; nitidus ; obscure viridi-æneus, corpore subtus piceo, antennarum basi palpis pedibusque rufis ; capite prothoraceque crebre subtilius punctulatis, puncturis obscure longitudinaliter strigatim positis ; prothorace leviter transverso, pone apicem rotundato dilatato, retrorsum sinuatim angustato, disco late longitudinaliter impresso, lateribus haud denticulatis ; elytris leviter striatis, striis sat subtiliter minus crebre (interstitiis hic illic sparsissime) punctulatis. Long., 1 l. ; lat., $\frac{2}{3}$ l.

The antennæ set back would about reach the base of the prothorax ; their club is very abrupt, the first two of its joints almost transverse, the third a trifle longer. The prothorax is punctured a trifle less finely and closely than the head ; its surface is noticeably uneven, having some obscure transverse impressions in addition to the longitudinal one ; near the base on either side is a little elevated pustule.

Superficially very like *Salpingus hybridus*, Er. (to which a specimen from Tasmania, given me by Mr. J. J. Walker, I have no doubt pertains) ; but the latter appears to be a genuine *Lissodema*, and also differs, *inter alia*, by its longer antennæ.

S. Australia ; under bark near Port Lincoln.

N. dentaticollis, sp. nov. Oblongo-ovatus ; nitidus ; obscure brunneus vel fere castaneus, vix ænescens, corpore subtus antennarum basi palpis pedibusque brunneo-testaceis ; capite subtilius, prothorace sat fortiter, crebrius punctulatis ; hoc sat transverso pone apicem sat dilatato, retrorsum

angustato, medio obscure impresso, lateribus sat fortiter sparsim denticulatis; elytris haud striatis minus fortiter sat crebre punctulatis, puncturis subseriatim positis. Long., $\frac{4}{5}$—$1\frac{1}{5}$ l.; lat., $\frac{3}{10}$—$\frac{3}{5}$ l.

Very distinct by the well-defined denticulations (about six in number) on each side of the prothorax. The antennæ seem a trifle longer than those of *N. corticalis*.

S. Australia; under bark near Port Lincoln.

LISSODEMA.

L. frigidum, sp. nov. Elongato-ovale; nitidum; obscure cupreo-æneum, antennarum basi palpis pebibusque testaceo-rufis; capite subtilius sat crebre, prothorace magis fortiter minus crebre, punctulatis; hoc vix transverso, obscure irregulariter impresso, pone apicem leviter dilatato-rotundato et retrorsum subsinuatim angustato, lateribus sparsim sat fortiter denticulatis; elytris leviter striatis striis subtilius minus confertim punctulatis, interstitiis sparsissime seriatim punctulatis. Long., 1 l.; lat., $\frac{2}{5}$ l.

The elongate slender tarsi of this species seem to forbid its generic association with any of those described above. I do not observe any character, however, inconsistent with a place in *Lissodema*. The denticulate sides of its prothorax will at once distinguish it from *L. hybridum*, Er.

Victoria; under bark on one of the higher mountains.

LAGRIIDÆ.

OMMATOPHORUS.

O. Mastersi, Macl. I have recently had the opportunity of examining the type of this species, and now (through the courtesy of Mr. Masters) possess an example. Sir W. Macleay was wrong in referring it to the *Lagriidæ* (he did so only with hesitation) as it is certainly a *Cistelid*. Its anterior coxal cavities are closed behind and its claws are strongly pectinated. It is extremely close to the species I have called "*Homotrysis rugulosa*, Boisd.?" (vide supra), scarcely differing from it except in the eyes of the male, being absolutely contiguous and the prothorax a little less sparsely and more strongly punctulate.

PEDILIDÆ.

MACRATRIA.

The following species seems to me capable of being referred to *Macratria* without being likely to cause confusion. M. Lacordaire places this genus in the *Pedilides*, which he separates from the *Anthicides* on the ground of their hind coxæ being contiguous or

nearly so, but later writers have found the distinction unworkable. From its reference by M. Lacordaire to *Pedilides* I presume that *Macratria* has the hind coxæ at least less separated than those of *Anthicus* (though the great French author does not categorically assert that they are), and since in the present insect they are little, if at all, less widely separated than in some *Anthici*, it seems probable that this insect might need to be regarded as representing a new genus very close to *Macratria*. But as I have not a type of *Macratria* for comparison it will be better to refer it to that genus, with which it agrees in its anterior coxal cavities open behind, in its elongate serrated maxillary palpi (of which the second and third joints are strongly and angularly produced on their inner side, the third very strongly transverse), and, in fact, in all the characters mentioned by M. Lacordaire, unless it be that specified above.

The Ven. Archdeacon King (Trans. Ent. Soc., N.S.W., II., p. 2) described an insect under the name *Macratria australis* from which the species before me seems to be very distinct, although I should judge from the description that it is congeneric; but on the other hand the venerable author states that his species resembles a *Dircæa*, a resemblance so improbable in a *Macratria*, that I cannot help thinking he meant to write that its *palpi* resembled those of *Dircæa*, to which, if it is a *Macratria*, no doubt they do bear some likeness, the serrated palpi being one of the most remarkable characters of the genus according to Lacordaire.

M. Victoriensis, sp. nov. Elongata; angusta; minus nitidas griseo-pubescens; nigra, elytris antennis palpis labro tibii; tarsisque castaneis; capite quam prothorax vixangustiori crebre subtilius punctulato; prothorace quam latiori sat longiori, retrorsum sat æqualiter arcuatim angustato, postice leviter canaliculato, confertim ruguloso; elytris coriaceis basi utrinque subgibbosis, quam prothorax sat latioribus, leviter striatis, striis leviter subcrasse punctulatis; antennis prothoracis basin vix attingentibus, articulis apicalibus 3 elongatis leviter incrassatis ultimo præcedentibus 2 conjunctis longitudine æquali.

Maris (?) abdominis segmento ventrali apicali fovea magna ovali instructo. Long., $1\frac{1}{3}$ l.; lat., $\frac{1}{2}$ l.

Victoria; Alpine district; on flowers.

ANTHICIDÆ.

It is with considerable hesitation that I refer to the *Anthicidæ* the very anomalous little insects which follow. Their facies is suggestive of *Xylophilus*, but the very distinct separation of

their hind coxæ forbids their being referred to the *Pedilidæ*. The remarkable tarsal structure may, perhaps, be thought equally inconsistent for an *Anthicid*, but I do not know any family of *Heteromera* with which it is not also inconsistent. The prosternum is excessively narrow (a mere line) in front of the front coxæ, which are widely open behind. As I have both sexes of the first species described, there is no doubt of its being genuinely heteromerous. If these insects had been before M. Lacordaire, when he wrote the "Genera des Coléoptères," I imagine he would have regarded them as belonging to a distinct family near the *Anthicidæ*.

I have before me six examples in all, which agree in the following principal characters:—Head not joined to prothorax by a distinct neck, eyes very coarsely granulated, pronotum not separated from flanks of prosternum by a distinct margin, anterior coxæ prominent, contiguous, nearly reaching the front of the prosternum, and widely open behind, hind coxæ not contiguous, tarsi heteromerous (the antepenultimate joint produced beneath in a kind of filament, the penultimate very small nodiform). These six examples pertain to five species, and it seems necessary to arrange the five species in three genera, in the first of which the eyes are very large, but not projecting much beyond the general contour of the head, and the intermediate tarsi long and slender; in the second the eyes are much smaller and conspicuously prominent, while the intermediate tarsi are very much shorter and stouter; and in the third the eyes are very prominent indeed, while the intermediate tarsi are almost as long and slender as in the first.

I presume these insects are rare, as the only examples I have seen referable to any of the genera are those described below.

SYZETON, gen. nov. (? hujus familiæ).

Palporum articulus apicalis late triangularis, maxillarium permagnus; caput breve, prothoraci sat late applicatum; oculi magni sat grosse granulati; antennæ validæ filiformes; prothorax transversus ad latera haud marginatus; pedes sat elongati; tarsorum articulus penultimus parvus nodiformis; tarsi posteriores 4 quam tibiæ vix vel paullo longiores, horum articulus primus quam ceteri conjuncti vix brevior vel manifeste longior; coxæ anticæ contiguæ prominentes postice apertæ, intermediæ posticæque modice approximatæ; processus ventralis inter coxas acutus; sutura ventralis prima in medio fere obliterata; corpus alatum pubescens; unguiculi simplices; tibiarum apice vix spinoso.

S. lætus, sp. nov. Oblongo-ovalis; subnitidus; subtus pubescens; supra pilis erectis vestitus; subtus piceus, supra læte rufo-

testaceus, capite antennis et elytrorum fascia lata mediana apiceque nigropiceis, pedibus anticis rufis posterioribus piceis (coxis femorum basi tarsisque rufis); supra sat fortiter (capite prothoraceque quam elytra paullo minus fortiter) minus crebre punctulatus, capite prothoraceque (quam elytra sat angustioribus) inter se latitudine æqualibus; hoc transverso postice leviter angustato, lateribus vix arcuatis.

Maris segmento ventrali apicali fovea leviter impresso; tibiis anticis apice manifeste arcuatis; oculis supra sat approximatis. Long., 1 l.; lat., $\frac{3}{10}$ l.

The antennæ of the male are a little more than half the length of the body, stout, and of almost even thickness, the second joint small, the eleventh twice as long as the tenth, the rest about equal in length, *inter se*, none of them transverse; those of the female are a little less than half the length of the body, and are very stout, joints 4-11 of even width and considerably wider than the basal 3 joints, 4-10 all transverse, 11 considerably longer than 10. Joints 1 and 3 are evidently longer than 4-10, joint 2 is small. The basal joint of the hind tarsi is about half again as long as (and much stouter than) all the others together; that of the intermediate is about equal to the apical four joints together. The antepenultimate joint is considerably produced below the following joints but does not appear to be lamellated.

Victoria; Alpine district, on flowers.

S. lateralis, sp. nov. Ovalis; minus parallelus; subnitidus; subtus pubescens; supra pilis erectis vestitus; rufo-testaceus, antennis (basi apiceque exceptis) capite prothorace et elytrorum macula utrinque laterali (hac vix ante medium posita) piceo-nigris, geniculis vix infuscatis; supra sat fortiter (capite prothoraceque quam elytra paullo minus fortiter) sat crebre punctulatus; capite transversim subquadrato quam prothorax sublatiori; hoc transverso antice sat angusto mox pone apicem latiori, lateribus (parte antica excepta) fere parallelis; elytris quam caput sat latioribus.

Mas latet. Long., $1\frac{1}{2}$ l.; lat., $\frac{1}{2}$ l.

Apart from the difference in colour and markings, the present species differs from the preceding, *inter alia*, in the structure of the antennæ, the basal joints of which are not noticeably more slender than the rest, nor any of the joints except the tenth transverse, the second joint, moreover, being not very much smaller than the first and third. The antennæ are about as stout as those of *S. lætus* but a trifle longer; their testaceous apical joint is very conspicuous. My example of this species

seems to be a female, although its antennæ are more like those of the male of *S. lætus*.

Victoria; Alpine district.

SYZETONINUS, gen. nov. (? hujus familiæ).

A genere *Syzeton* differt oculis minoribus magis prominentibus antennis magis gracilibus.

In other respects the characters mentioned above for *Syzeton* may be read as applying to this genus.

These characters may appear slight as generic, but the difference in the structure of the head and antennæ certainly seem to me more than specific. In *Syzeton* the eyes are extremely large, but are contained within the head (so to speak), the base of the head extending distinctly behind the eyes almost as far laterally as the widest part of the eyes, so that the head is subquadrate; in *Syzetonellus* and *Syzetoninus* the eyes are considerably smaller, but the base of the head does not extend laterally behind them, so that the head is not at all quadrate. This, together with the considerable antennal difference, gives the insects a very different facies. *Syzetoninus* differs from *Syzetonellus* in the intermediate tarsi being long and slender, like those of the hind legs, and in the less complete obliteration of the first ventral suture.

S. mundus, sp. nov. (Mas ?). Elongato-ovalis; vix nitidus; pilis brevibus adpressis minus confertim vestitus; subtus piceo-niger, capite nigro, prothorace rufo, elytris pallide testaceis macula communi basali triangulari fascia mediana undulata maculaque communi apicem insidenti piceis ornatis, antennis palpis pedibusque rufo-testaceis; capite prothoraceque sat crebre sat fortiter punctulatis; hoc transverso ante basin bifoveolato, lateribus sat arcuatis; elytris sat crebre minus fortiter punctulatis; femoribus posticis subtus dentatis. Long., 1 l.; lat., $\frac{3}{10}$ l.

The antennæ are not quite so long as half the body; they are nearly filiform, joints 1 and 2 a little stouter than the following ones, 3 quite small, 4 cylindric, 5-10 not differing much *inter se*, but gradually a little stouter, and a little more triangular in shape; 11 about twice as long as 10.

S. Australia; near Port Lincoln.

S. inconspicuus, sp. nov. (Mas.). Elongato-ovalis; subnitidus; pilis brevibus adpressis minus confertim vestitus; subtus piceo-niger, capite nigro, prothorace elytris antennarum basi pedibusque brunneis; supra sat crebre subfortiter punctulatus; prothorace quam caput angustiori, transverso, ante medium transversim canaliculato, ante basin fovea magna

arcuata impresso, postice vix angustato, lateribus vix arcuatis; elytris pone basin arcuatim impressis; segmento ventrali apicali leviter impresso. Long., $\frac{2}{3}$ l.; lat., $\frac{3}{10}$ l. (vix).

The antennæ are considerably more than half as long as the body; the basal two joints (which are of testaceous-brown colour) are a little stouter than the rest, the first much longer than the second; 3-7 are cylindric, slightly increasing in length (3 notably the smallest of them, but evidently longer than 2), 8-10 a little stouter than the preceding joints, but not longer; 11 a little longer and stouter. The incrassation of the antennæ towards their apex is very slight, and the only joint among the apical 6 or 7 that is at all markedly different from the rest is the eleventh.

S. Australia; near Port Lincoln; under bark of *Eucalyptus*.

SYZETONELLUS, gen. nov. (? hujus familiæ).

A genere præcedenti differt oculis multo minoribus magis prominentibus, antennis magis gracilibus, pedibus minus elongatis, tarsis intermediis quam tibia multo brevioribus (illorum articulo 1° quam ceteri conjuncti sat breviori), sutura prima ventralifere tota obliterata.

In all other respects the characters mentioned above for *Syzeton* may be read as applying to this genus.

S. alpicola, sp. nov. (Mas.) Ovalis; subnitidus; pilis brevibus adpressis minus confertim vestitus subtus niger, capite palpisque nigro-piceis, antennis pedibusque rufo-testaceis, prothorace rufo-piceo, elytris brunneo-testaceis apicem versus obscurioribus utrinque fascia lata mediana picea (suturam haud attingente) ornatis; supra sat crasse subcrebre punctulatus; capite quam prothorax, hoc quam elytra, sat angustioribus; prothorace vix transverso subquadrato, lateribus leviter arcuatis; femoribus posticis valde incrassatis; tibiis posticis fortiter compresso-dilatatis ante apicem externe emarginatis; metasterno utrinque tuberculo instructo. Long., $\frac{7}{10}$ l.; lat., $\frac{3}{10}$ l. (vix.).

The antennæ are slightly longer than half the body, and are moderately stout, the basal two joints scarcely different, *inter se*, stouter than the following ones, but scarcely longer, joints 3-6 cylindric, 7-10 obconic slightly stouter, 11 evidently stouter and longer than 10, pointed at the apex.

It is probable that the dilated hind femora (almost like those of a *Haltica*) and the compressed hind tibiæ as well as the tuberculate metasternum are peculiar to the male.

The black palpi, in contrast with the rufo-testaceous antennæ, furnish a conspicuous character.

Victoria; Alpine district.

MORDELLIDÆ.

MORDELLA.

M. Baldiensis, sp. nov. Nitida; nigra; supra, aureo, subtus argenteo, pubescens, prothorace et elytris subcœruleo-micantibus. Long., $1\frac{1}{2}$—$1\frac{3}{4}$ l.

This little species is entirely devoid of distinct markings, but the evenly-distributed pubescence has an appearance resembling a pattern which varies infinitely according to the way the light falls on it. If the insect be looked down upon from above there seems to be a line running from each shoulder to the suture at about a third of its length, and then continuing along the suture, and as the point of view is moved backward the lines from the shoulder seem to lengthen and meet the suture further from the base. From a certain point of view there seems to be a facia behind the middle, which seems to move its position as the point of view is shifted.

Victoria; on a mountain called Baldi; on flowers.

ŒDEMERIDÆ.

TRICHANANCA (gen. nov.).

Mentum antice acuminatum; palporum maxillarium articulus apicalis magnus late triangularis; labrum transversum antice subtruncatum; caput sat breve; oculi magni prominuli grosse granulati rotundati vix emarginati; antennæ prope oculos insertæ validæ minus elongatæ 11-articulatæ filiformes; prothorax cordiformis; elytra sat elongata; femora linearia sat elongata; tibiæ anticæ spinis singulis armatæ; tarsorum articulus penultimus, – anticorum articuli omnes,—subtus tomentosi, anticorum articulo basali intus valde dilatato; corpus pilis erectis vestitum.

The single spur of the front tibiæ will distinguish this genus from *Sessinia;* from *Nacerdes* (Ananca) it may be known, *inter alia*, by its round prominent coarsely-granulated eyes, and the erect pilosity with which it is clothed.

T. Victoriensis, sp. nov. Rufo-brunnea, corpore subtus pedibusque dilutioribus; supra pilis erectis vestita; nitida; crasse minus crebre punctulata, puncturis in elytris seriatim positis; prothorace (quam caput paullo latiori, quam elytra paullo angustiori) leviter transversus, pone apicem fortiter rotundato-dilatato, lateribus pone medium concavis fovea permagna utrinque posita. Long., $2\frac{1}{2}$ l.; lat., $\frac{7}{10}$ l.

The shape of the prothorax is unusual, the sides behind the middle being rendered deeply concave by the presence of a very large and deep fovea which interrupts the outline, being placed

in the declivous lateral portion of the segment. The antennæ set back reach a little beyond the base of the prothorax; they are very stout, the basal joint the stoutest, the second short, the third about twice as long as wide (equal in length to the first), the fourth a little shorter, the fifth and following joints (except the last, which is nearly twice as long) each about equal to the third.

I am doubtful of the sex of my example of this insect, but the long apical joint of the antennæ and the lobe-like production of the basal joint of the front tarsi on the inner side are perhaps likely to be characteristic of the male.

Victoria; Alpine district.

LONGICORNES.

PHACODES.

P. validus, sp. nov. Brunneus in partibus nonnullis cinereo-pubescens; prothorace sat transverso, sparsim æqualiter (nisi disco postice) granulato, disco postice spatiis nitidis subelevatis obscure notato, lateribus æqualiter sat fortiter rotundatis; elytris pone medium cinereo-fasciatis, apice spina elongata acuta armatis, sparsim sat æqualiter tuberculis parvis obtusis ornatis, antice fortiter rugulose postice minus perspicue punctulatis; antennis (maris ?) quam corpus longioribus, subtus piloso-ciliatis, parte apicali rufescenti, articulo 3° quam 4^{us} fere dimidio longiori; pedibus cinereo-pubescentibus maculis parvis nudis ornatis; corpore subtus maculatim brunneo-cinereoque-pubescenti. Long., 13½ l.; lat., 3⅝ l.

A large and distinct species with a thin ashy pilosity over the whole upper surface; this ashy pilosity becomes in parts so dense as entirely to conceal the general sculpture (saving that the granules and tubercles protrude through it). The dense pubescence covers the head, the prothorax (except the hinder parts of the middle of the disc), the scutellum, the shoulders, and the apex of the elytra, and forms a transverse fascia a little behind the middle of the elytra; the pilosity near the hinder part of the lateral margin is also a little more dense than on the general surface, so that the fascia and apical pilosity are indistinctly connected laterally, and in that part the derm is of a somewhat reddish tone.

Compared with *P. obscurus*, Fab., this species is evidently larger and of stouter and more robust appearance, with much stouter antennæ (thin apical spines traceable quite to the eighth or ninth joint), densest parts of the pubescence much more dense, tubercles on elytra smaller and more numerous, apical spines of elytra very much longer and more developed, the third joint of

the antennæ very noticeably shorter in proportion to the fourth joint, &c., &c.

Queensland; sent to me by F. M. Bailey, Esq.

P. bellus, sp. nov. Niger in partibus nonnullis dense albido-pubescens pedibus antennisque rufescentibus; prothorace sat transverso, fortius rugulose punctulato, latera versus sparsim granulato, disco postice spatiis nitidis elevatis notato, lateribus paullo pone medium subangulatis, ante basin subsinuatis; elytris antice fortiter rugulose postice minus perspicue punctulatis, spatiis elevatis inæqualibus nonnullis permagnis) nitidis elevatis passim ornatis, apice emarginatis bispinosis, spinis externis elongatis acutis internis brevibus obtusis; antennis maris quam corpus multo longioribus, subtus subtiliter piloso-ciliatis, a basi extrorsum gradatim rufescentibus, articulo 3° quam 4 us vix plus quam dimidio longiori; pedibus albido-pubescentibus, maculis parvis nudis ornatis. Long., 8-12 l.; lat., $2\frac{1}{5}$-$3\frac{1}{2}$ l.

The whitish-grey pubescence of the upper surface is dense and extensive enough to give the appearance of the general surface being almost white, the non-pubescent parts looking like black markings. The non-pubescent parts are mostly elevated, but the one of them that is largest in area (a wide ante-median fascia on the elytra, widest on the margin and much interrupted at the suture) is on the level of the general surface; this non-pubescent part is coarsely rugulose, the rest being lævigate or nearly so. The elevated non-pubescent spots consist of a number of small granules protruding through the pubescence on the sides of the prothorax, a short longitudinal ridge on the middle line of the prothorax (entirely in the basal half), with an irregular, somewhat lunate ridge on either side of it (these lunate ridges longer than the central one and not quite glabrous), and a number of spaces on the elytra resembling obtuse feebly-elevated tubercles, some of those in the hinder half being very much larger in area than the rest, and having a diameter scarcely less than a third of the width of the elytron. As in the preceding species the derm near the apex has more or less tendency to a reddish tone of color. In the examples before me the pubescence on the head is patchy, and in parts thin; this may be due to abrasion. Joints 3-7 of the antennæ are distinctly spined.

This species is at once distinguished from most of its congeners by the bi-spinose emargination of the apex of the elytra (though the *sutural* apex is an angle rather than a well-defined spine); and by the form of the prothorax, the sides being nearly straight from close behind the front to behind the middle, and then converging from a fairly well-defined angle somewhat sinuously to

the base. The two examples before me are of very different size but otherwise identical. They both seem to be males.

N. S Wales; Richmond River district.

P. marmoratus, sp. nov. Brunneo-piceus, maculatim ochraceo-et albido-dense pubescens; prothorace sat transverso, subtiliter sparsim granulato, indistincte ruguloso, spatiis 9 elevatis nitidis ornato, his pube densissima ochracea circumcinctis vel totis abditis, lateribus 2-tuberculatis et pone medium sinuatim convergentibus; elytris antice fortiter minus crebre postice leviter obscure punctulatis, postice spatiis parvis nitidis vix elevatis ornatis, apice oblique truncatis, truncatura externe spina valida armata; antennis maris quam corpus sat longioribus, subtus piloso-ciliatis, articulo 3° quam 4^{us} paullo longiori; pedibus albido-pubescentibus, maculis parvis nudis ornatis. Long., 111.; lat., $3\frac{1}{6}$ l.

A narrow elongate, somewhat frail-looking species for a *Phacodes;* extremely distinct by the dense ochraceous pubescence which forms conspicous markings on the head and prothorax. On the head it forms a ring round the eyes. The prothorax is very peculiarly sculptured; the lævigate spaces (which are very strongly elevated) are—a short longitudinal space in the middle near the base, and eight tubercles arranged in two transverse rows, both of which are arched hindward, so that the two inner tubercles of each row are nearer the base than the external ones, which are placed very near each other (one in front of, the other slightly behind, the middle). The external tubercles are on the margin, and interrupt the lateral edges, which converge somewhat sinuously behind them. The inner tubercles are elongate, and placed obliquely, and are much larger than the external ones; they are more or less surrounded with a dense ochraceous pubescence, which gives them an ocellated appearance. The external tubercles are completely buried in dense ochraceous pubescence. The general surface of the prothorax is very even, but bears some small sparse granules. The elytra are nearly five times as long as the prothorax; they are very evenly marbled with whitish and ochreous pubescence in patches, these patches not taking any very defined form; in some places, however, the pale pubescence forms rings round dark glabrous spots, especially along the lateral edge, and from a certain point of view there seems to be traceable a continuous zigzagged whitish line running from the middle of the margin obliquely to the suture, following the suture nearly to the apex, and then returning sinuously up the disc. The single strong sharp spine in the middle of the apex of the elytra is a notable character. Joints 3-5 of the antennæ are spined.

Australia; I am doubtful of the exact habitat.

PHYTOPHAGA.

ORCUS.

O. cœlestis, Blackb. This name was accidentally printed "*O. cœlestris*" in Tr. Roy. Soc., 1891, p. 153, where the species is described.

EDUSA.

E. læta, Blackb. This name was accidentally printed "*E. lata*" in Tr. Roy. Soc., 1891, p. 148, where the species is described.

E. glabra, Blackb. In describing this species (*l.c.*, p. 152) I accidentally omitted to say that it is found in Queensland.

Description of a New Species of Fabularia.

By M. C. Schlumberger.

(Communicated by Walter Howchin, F.G.S.)

[Read October 6, 1891.]

Plate XIII., figs. 5-8.

A few months ago I received from Mr. Sherborn, of London, several Foraminifera discovered by Mr. Howchin* in the Miocene beds of Muddy Creek, Victoria. Two of them seemed to be *Biloculinæ* with large longitudinal costæ and a cribriform aperture. These characters were remarkable enough, inasmuch as all known species of *Biloculina*, except *B. comata*, Brady, are smooth, and have a single tooth in the oral aperture. It was an easy matter to mistake the generic relationships of the specimens, as they were much weathered. Happily, Mr. Howchin obtained other specimens and kindly forwarded them to me. They are true *Fabularia*, and their discovery in a fresh locality is of the greatest interest, as the genus is only known by a single species from the Eocene *(Calcaire grossier)* of Paris and Egypt.

Two of the five specimens sent are sufficiently complete to allow a recognition of the external characters, and furnish material for a good drawing. The other three were used for the execution of two transverse and a longitudinal section. They all belong to the Form B,† whilst the Form A remains to be dis-

* The objects referred to by Mr. Schlumberger are the same as were briefly noted by me in "The Foraminifera of the Older Tertiary of Muddy Creek" as *Biloculina species* (Trans. Roy. Soc. S. Aus., vol. XII., p. 1), and which at the time of publication had been mislaid after having been submitted to the late Dr. H. B. Brady. The weathered condition of the test, added to the extraordinary external resemblance which this interesting object bears to the genus *Biloculina*, misled Dr. Brady, as it did Mr. Schlumberger in the first instance, and it was only on my making a section of the object that its true generic relationship was made apparent.—W. Howchin.

† Interesting researches, bearing on the internal structure of the Foraminifera, made by the eminent specialists, MM. Munier-Chalmas and C. Schlumberger, have established the fact that many Foraminifera, notably Nummulites and the Miliolidæ, possess a dimorphic structure in their respective species. The dimorphism is of a similar kind in all the genera and species which exhibit the phenomenon, and determines the size and arrangement of the initial chambers. The authors referred to above distinguish the dimorphic types as Form A and Form B. The former possesses, relatively, a very large initial chamber, whilst in the latter the initial chamber is small, and is surrounded by numerous small and gradually enlarging chambers.—W. Howchin.

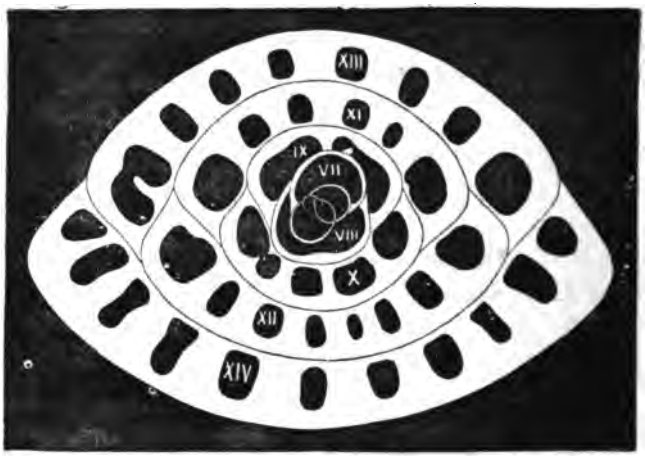

Fig. 2. *Fabularia Howchini*, Schlumberger. Form B, x 50 diam.*

The fig. 2 gives the reproduction of the complete medial section of a specimen of the Form B whose central chambers were partly destroyed. It will be seen that the successive chambers, increasing by external growth, are more and more divided into longitudinal canals by large ribs, whose calcareous deposit is extended over the outward face of the preceding chambers, so that each chamber becomes a complete investment, as in all the *Miliolidæ trematophoræ*.

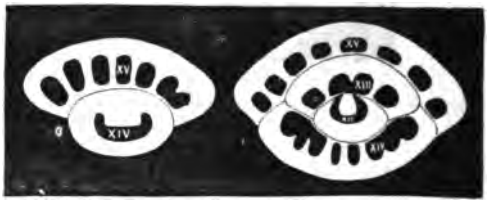

Fig. 3. Fig. 4.

Fabularia Howchini, Schlumberger. x 20 diam. Successive appearances of the preceding specimen, fig. 2.

The figs. 3 and 4 give the appearance of successive sections of the same specimen (fig. 2) taken, the former at the beginning of the operation, the latter at the quarter of the length. They show that the apertures of the chambers (XIV., fig. 3, and XIII.,

* During the preparation of this section the last chamber (XV.) was lost.

fig. 4) are occupied by a very large tooth. The superior part of this tooth divides itself in numerous ramifications, which also divide themselves and form the wall of the preceding chamber, thus constituting a trematophore with large openings.

From the comparison of the sections fig. 4 and fig. 2, it appears that the number of the canals increases towards the middle (in length) of the chambers, *i.e.*, the chamber XIII. (fig. 4) has only three canals, the middle beginning to divide; on the median section (fig. 2) the same chamber is composed of eight canals, the one being nearly subdivided by an internal rib. A similar division is to be seen in one of the canals of chamber X. (fig. 2) by the formation of two opposite ribs, and it is therefore evident that the canals of the same chamber communicate with each other as in *Fabularia discolithes*.

Exterior characters (Plate XIII., figs. 5 to 8).—Plasmostracum free, with a regular ovoidal outline in breadth, compressed on the thickness, showing only two chambers, as in the true *Biloculinæ*. Test porcellanous, smooth, showing by transparency the disposition of the inner canals. Aperture formed by a small exhausted trematophore (fig. 8) with large perforations of various forms.

Dimensions of the figured specimen. — Length, 2mm., 7; breadth, 2mm., 8; thickness, 1mm., 2.

Locality.—The specimens which form the subject of the present note were found by Mr. Howchin in the Upper Division of the Muddy Creek Beds, Victoria, which I am informed Prof. R. Tate, of Adelaide, has referred to an age approximating to the Upper Eocene, or perhaps somewhat later.

Observation.—It is known that the chambers of *Fabularia discolithes*, Defrance, are composed of several rows of longitudinal canals of various dimensions, that the interior of the test is marked by numerous pits, and that the plasmostracum is compressed on the breadth whilst *Fabularia Howchini* has a smooth test, a single row of canals, and the compression of the plasmostracum is on the thickness.

DESCRIPTION OF PLATE XIII., figs. 5 to 8.

Fig. 5. *Fabularia Howchini*, Schlumberger. Lateral view of test. x 17 diam.
Fig. 6. " " Peripheral aspect of same specimen.
Fig. 7. " " End view showing aperture.
Fig. 8. " " Greatly enlarged view of aperture, exhibiting its cribriform character. x 40 diam.

The Foraminifera of the Older Tertiary (No. 2, Kent Town Bore, Adelaide).

By Walter Howchin, F.G.S.

[Read March 3, 1891.]

Plate XIII., figs. 11 to 13.

In 1881 a bore was put down in the Waterworks Yard, in the eastern suburb of Adelaide, under the control of the Hydraulic Department. Prof. R. Tate F.G.S. examined the cores as the work proceeded, and has described the section in detail. (Vide Trans. Roy. Soc., S.A., vol. V., p. 40). The first 69 feet of the section consists of Pliocene Drift, underlying which, in descending order, there follow about 290 feet of Lower Tertiary beds, the upper half of which are marine, and the lower lacustrine. The marine beds are fossiliferous at intervals throughout the section. The most important fossiliferous horizon occurs at the base of the marine rocks, the latter having the lithological features of brown and green clayey sands, 23 feet in thickness. It was from the examination of material from this bed that the following Foraminifera have been determined :—

FAMILY MILIOLIDÆ.

Genus—Biloculina, *d'Orbigny.*

1. *B. ringens*, Lamk. Sub-globose examples, such as Reuss has named *B. turgida*, but has not the value of a varietal distinction. Rare.

Genus—Miliolina, *Williamson.*

2. *M. trigonula*, Lamk. Rare.
3. *M. oblonga*, Montag. Large examples, some with produced neck. Rather scarce.
4. *M. seminulum*, Linn. Rather scarce.
5. *M. Ferussacii*, d'Orb. Compressed and starved examples. Rather scarce.

Genus—Cornuspira, *Schultze.*

6. *C. involvens*, Rss. Rather scarce.

FAMILY LITUOLIDÆ.

Genus—Haplophragmium, *Reuss.*

7. *H. agglutinans*, d'Orb. The few examples obtained of this species show a considerable range as to texture. The larger

examples are coarsely arenaceous, whilst the smaller specimens are smoother, with larger proportion of cement, and more distinct septation. Rare.

Genus—TEXTULARIA, *Defrance.*

8. *T. gibbosa*, d'Orb. Rare.
9. *T. agglutinans*, d'Orb. Moderately common.

Genus—GAUDRYINA, *d'Orbigny.*

10. *G. rugosa*, d'Orb. Rare.

Genus—BULIMINA, *d'Orbigny.*

11. *B. pupoides*, d'Orb. A few fine examples.
12. *B. pyrula*, d'Orb. Moderately common.

Genus—BOLIVINA, *d'Orbigny.*

13. *B. punctata*, d'Orb. Rare.

Genus—CASSIDULINA, *d'Orbigny.*

14. *C. subglobosa*, Br. Small examples, and rather scarce.

FAMILY LAGENIDÆ.

Genus—LAGENA, *Walker* and *Jacob.*

15. *L. lævis*, Montag. Rare.
16. *L. sulcata*, W. and J. Rare.
17. *L. squamosa*, Montag. Rare.
18. *L. hexagona*, Will. Rare.
19. *L. marginata*, W. and B. Rare.

Genus—NODOSARIA, *Lamarck.*

20. *N. (Dentalina) soluta*, Rss. Rather scarce.
21. *N.* " *obliqua*, Linné. Rare.
22. *N. scalaris*, Batsch. Rare, but includes one large example of six segments.
23. *N. verruculosa*, Neugeb. One example of four segments. Not very characteristic, as the costæ are serrate rather than tuberculated.

Genus—VAGINULINA, *d'Orbigny.*

24. *V. legumen*, Linné. Rare.

Genus—CRISTELLARIA, *Lamarck.*

25. *C. cultrata*, Mont. Rare.

Genus—POLYMORPHINA, *d'Orbigny.*

26. *P. gibba*, d'Orb. Common, often with tubulose growths.
27. *P. regina*, Br., P., and J. Rare.

28. *P. lactea*, W. and J. Rare.
29. *P. communis*, d'Orb. Rare.
30. *P. elegantissima*, P. and J. Moderately common.

Genus—UVIGERINA, *d'Orbigny*.

31. *U. angulosa*, Will. A few very small examples.

FAMILY GLOBIGERINIDÆ.

Genus—PULLENIA, *Parker* and *Jones*.

32. *P. sphæroides*, d'Orbigny. Rare.
33. *P. quinqueloba*, Reuss. Rare.

FAMILY ROTALIDÆ.

Genus—SPIRILLINA, *Ehrenberg*.

34. *S. decorata*, Brady. In the paper on the "Muddy Creek Foraminifera" (Trans. R. Soc., S. Aus., vol. XII., p. 11), I have pointed out the slight variation which this species, as well as the next described, exhibits from the recent forms obtained from the Challenger material. The Kent Town examples possess the same varietal features as those obtained from Muddy Creek, but are in much greater numbers than in the latter district. Moderately common.
35. *S. tuberculata*, Brady. Moderately common.

Genus—DISCORBINA, *Parker* and *Jones*.

36. *D. globularis*, d'Orb. Rare.
37. *D. biconcava*, Parker and Jones. Rare.

Genus—PLANORBULINA, *d'Orbigny*.

38. *P. mediterranensis*, d'Orb. Rare.
39. *P. (?) acervalis*, Brady. A single example of very irregular acervaline growth. It does not conform to the usual character of this species, but may be only an aberrant growth.

Genus—TRUNCATULINA, *d'Orbigny*.

40. *T. lobatula*, W. and J. Rather scarce.
41. *T. Ungeriana*, d'Orb. One of the commonest species of the material.
42. *T. margaritifera*, Br., var. *Adelaidensis*, var. nov., pl. xiii., figs. 11-13. Test rotaliform, much compressed laterally, consisting of 2-3 convolutions, and about twelve chambers in all. Superior surface nearly flat. Inferior surface slightly convex. Sutural lines depressed, and on superior surface strongly curved. On the inferior side the septation is marked by irregular depressed lines, enclosing

inflated raised areas. Peripheral margin sharp and sometimes furnished with a keel of considerable extent. Primordial region umbonate on superior surface, a feature which in very thin examples is visible on inferior side as well as superior. Surface of test ornamented on both sides (with the exception of final segment) by thickly set minute tubercles. Diameter, $\frac{1}{25}$ in.

This variety is distinguishable from the type by its greater lateral compression, fewer chambers, irregular septation on inferior surface, umbonate features of early chambers, and the general distribution of ornamentation on both faces. It is moderately common in the material from the Adelaide Bore, and is one of the most interesting species of the section. The "Challenger" localities for the species were Phillippine Islands, New Hebrides, and coast of the Korea.

Genus—ANOMALINA, *d'Orbigny.*

43. *A. ammonoides*, Reuss. Rare.

Genus—PULVINULINA, *Parker* and *Jones.*

44. *P. Hauerii*, d'Orb. Rare.
45. *P. repanda*, F. and M. Rare.

Genus—ROTALIA, *Lamarck.*

46. *R. Soldanii*, d'Orb. Rare.

The Foraminifera, as determined from the material examined, have been referred to 46 species, belonging to 23 genera, and includes one variety not hitherto described. The Foraminifera as a whole bear a striking resemblance to those found in the Lower Bed of the Muddy Creek section, Victoria (*vide* Trans. Roy. Soc. S. Aus., vol. XII., p. 1), there being no less than 35 species common to the two localities, whilst only 11 are found in the Kent Town material which are unrecorded from Muddy Creek. It is also interesting to note that of the 35 species referred to, 16 are common to both the Upper and Lower Beds of Muddy Creek, whilst the remaining 19 are found in the Lower Bed only. The importance of the last mentioned fact will be understood when it is stated, that whilst 19 species distinctive of the Lower Bed are found in the Kent Town material, not one of the species limited to the Upper Bed of Muddy Creek has been detected in the Kent Town Bore. The palæontological evidence is therefore very definite in leading us to assign a geological age to the marine beds of the Kent Town Bore closely synchronous with those of the Inferior Beds of Muddy Creek, which, as determined by Prof. Tate from the higher organisms, must be low down in the Tertiary series. The remarkable affinities which the foraminiferal fauna exhibit to the Lower as compared with the

Upper portions of the Muddy Creek Beds gives independent confirmation of the conclusions already reached from their dissimilar fossil contents of a well-marked unconformability existing in the Tertiaries of Western Victoria.

General Microzoa.—The following were observed in course of examination of material, viz. :—Several species of Entomostraca, otolites, small fish bones, and a few straight and rough arenaceous tubes of doubtful affinities.

DESCRIPTION OF PLATE XIII., figs. 11 to 13.

Figs. 11-13. *Truncatulina margaritifera* var. *Adelaidensis*, Howchin.
Fig. 11. Lateral view of superior surface of test. x 36 diam.
Fig. 13. Lateral view of inferior side, showing oral aperture somewhat broken.
Fig. 12. Peripheral aspect, showing the compressed features of the test oral aperture aud biconvex outline of the primordial region.

The Foraminifera of the Older Tertiary, Muddy Creek, Victoria — Addenda et Corrigenda.

By Walter Howchin, F.G.S.

[Read March 3, 1891.]

Plate XIII., figs. 9, 10.

In the paper published on the above subject (Trans. Roy. Soc., S. Aus., vol. XII., p. 10) it was stated that a very fine example of what was undoubtedly a new species of *Rhabdogonium* had been obtained from the Upper Bed of the Muddy Creek section, but as it was mislaid at the time of publication it could not be described. It has since been found, and I now submit the following description.

FAMILY LAGENIDÆ.

Genus—Rhabdogonium, *Reuss.*

Rhabdogonium exsculptum, *sp. nov.* Plate xiii., figs. 9-10.

Test elongate, straight, tapering towards either extremity; triangular in transverse section, exhibiting three very strong longitudinal ridges, separated by deep grooves; ridges blunt, and quadrate on their outer faces. Longitudinal grooves deep, penetrating nearly to the centre of the test. Septal lines flush, straight, and very numerous. Aperture, a circular mouth at end of produced neck. Length, $\frac{1}{10}$ in.

This is a somewhat remarkable form. Its nearest ally is *R. tricarinatum*, d'Orb., but can be readily distinguished from that species by its three conspicuous keels or ridges, which practically compose the whole of the shell, and also by the greater number of its chambers. It is apparently restricted to the Upper Bed of the Muddy Creek (? Miocene) section, in which it is rare.

DESCRIPTION OF PLATE XIII., figs. 5-10.

Figs. 5-8. *Fabularia Howchini*, Schlumberger. For descriptiont see p. 346. of present volume. Upper Bed, Muddy Creek.

Fig. 9. *Rhabdogonium exsculptum*, Howchin. Lateral view, showing deep groove. x 20 diam. Upper Bed, Muddy Creek.

Fig. 10. *Rhabdogonium exsculptum*, Howchin. Transverse section of test.

By a clerical oversight the following species were omitted from the list of Foraminifera as published *loc. cit.*, p. 16, from the Upper Bed at Muddy Creek :—

Genus—POLYSTOMELLA, *Lamarck.*

181*a*. †*P. striato-punctata*, F. v. M. Rare.
181*b*. †*P. subnodosa*, Münster. Common.
181*c*. †*P. crispa*, Linn. Rather scarce.

Mr. Sherborn, of London, has kindly drawn my attention to the fact that *Orbitoides stellata*, described and figured by me in *loc. cit.*, p. 17, pl. i., figs. 9-11, has been described by d'Archiac in Mém. Soc., Géol., France, ser. 2, vol. XI., plate vii., fig. 1, and, by a curious coincidence, under the same specific name. D'Archiac's specimens were from the Tertiary of Les Corbières. Hantken has also obtained the same form from the Tertiaries of Hungary.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1890-91.

ORDINARY MEETING, NOVEMBER 4, 1890.

WALTER HOWCHIN, F.G.S. (Vice-President), in the chair.

PAPER.—"On the Geological Structure of the Adelaide Plains, with special reference to the Croydon Bore and the so-called Coal Discoveries at Adelaide," by Prof. RALPH TATE, F.G.S., F.L.S., &c., &c.

ORDINARY MEETING, DECEMBER 2, 1890.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

EXHIBITS.—A. ZIETZ, Assistant Director of the S.A. Museum, showed marine specimens taken from the Port Darwin telegraph cable at the site of its fracture, near the coast of Java, namely, a stalked feathered-starfish *(Pentacrinus)*, 2 species of free feathered-starfish *(Comatula)*, 2 large brittle starfish, and a number of *Cirripedia* of deep-sea forms. Also 8 species of crustaceans, of which several are probably new to science.

MOTIONS.—It was moved that a grant of money be made towards defraying the expenses of the proposed Antarctic Expedition. The motion was lost, but at the same time the Council was desired to inform the Committee of the expedition that, whilst fully sympathising with the scientific objects in view, the Society did not feel justified in granting any sum of money, as it had various important claims upon it connected with South Australia. Prof. TATE moved and Prof. RENNIE seconded and it was unanimously carried—"That this meeting learns with deep regret the loss sustained by the Linnean Society of New South Wales and science in general by the death of its President (Prof. W. J. Stephens)." It was moved and carried—"That it be a recommendation to the Council to solicit from Mr. James Parkinson a paper detailing his important geological discoveries in the neighbourhood of Leigh's Creek."

PAPERS.—"The Cryptogamic Flora of South Australia," by Prof. LUDWIG, Ph.D. "The Grammar and Vocabulary of a Tribe of Natives Inhabiting Central Australia, between the Finke River and Alice Springs," by Rev. H. KEMPE. "Remarks on Plants in South Australia very probably aiding in the Propagation and Perpetuation of the Red Rust *(Puccinea rubigovera)*," by J. G. O. TEPPER, F.L.S. "Description of a New Species of Cossus," by J. G. O. TEPPER, F.L.S.

ORDINARY MEETING, FEBRUARY 3, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

BALLOT.—Ernest C. Saunders and Edwin Ashby were elected Fellows.

EXHIBITS.—W. HOWCHIN, F.G.S., exhibited an extensive collection of Celts or stone hatchets from Great Britain, Denmark, India, and Australia. Also a carbonaceous shale, of Archæan age, from near the Burra, of a black colour, which, on exposure to heat, turns white and loses 18 per cent. of its weight. J. J. EAST, F.G.S., showed specimens of *serpentine* from the Monarch Mine, near Caroona, Lake Gillies; it was supposed to contain nickel, but the blowpipe test did not reveal that metal. Also a specimen of *emery*, found recently in the Mount Lofty Ranges. J. G. O. TEPPER, F.L.S., exhibited the fruits of *Adamsonia*, from Western Australia, forwarded by his son. Also a specimen of a New Zealand edible fungus *(Hirneola polytricha)*, growing abundantly about Auckland, chiefly on the decaying wood of *Corynocarpus lævigatus* and *Melicytus ramiflorus*, forwarded by Allan Wight, of Pæraa. A. ZIETZ, Assistant-Director of the S.A. Museum, showed a number of native spear-heads, made from various materials, some elaborately carved. D. B. ADAMSON exhibited photographs of the recent solar eclipse.

PAPER.—"Coast Limestones of Fremantle, Western Australia," by Rev. J. G. NICOLAY.

ORDINARY MEETING, MARCH 3, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

BALLOT.—Walter Gill, F.L.S., Conservator of Forests; W. H. Selway, jun., and Dr. J. Johnson, F.R.C.S. (Eng.), were elected Fellows of the Society.

MOTION.—A communication received from the Hon. Secretary (A. E. McDonald, Esq.) of the Royal Geographical Society of Australasia (Victorian Branch) was read, to the effect that "at a meeting of the Antarctic Committee, February 24, 1891,

Captain Pascoe, R.N. (President), was deputed to interview the Melbourne delegates to the Sydney Federal Convention. Will you take immediate steps and urge your representatives to give cordial support to the movement?" It was moved and decided to give the movement the hearty and moral support of the Society, and to telegraph to the Premier (Hon. Thomas Playford), requesting him to recommend the matter for the consideration of the Federal Council.

EXHIBITS.—J. G. O. TEPPER, F.L.S., laid on the table two old and rare books—*(a)* "Philosophic Transactions of the Royal Society, London," 1684; *(b)* Swartz's "Observationis Botanicæ," 1791. Also some red earth from Roebuck Bay, Western Australia, eaten by the natives there, not from necessity, but as an article of their diet. Also the fruits of *Citrus australasica*, from Cooper's Creek, and *Capparis Mitchelli*. Also several insects, *e.g.*, a wasp with a spider it had caught, forwarded by Mr. Stacey; a specimen of *Perga affinis* and its larvæ; and a nocturnal moth with its underground cell, in which the pupa was lodged. A. ZIETZ, Assistant-Director of the Museum, exhibited some snakes from Central Australia, forwarded by Rev. H. Kempe (Correspond. Memb.), viz.:—Skin of an enormous poisonous snake, nine feet in length, belonging to the genus *Tropidechys*, sp. nov.; a specimen of the genus *Hoplocephalus*, sp. nov.; and specimens of *Furina Ramsayi* and *Vermicella Bertholdi*. Also, a species of perch from the R. Finke; and a sample of white chalky earth.

PAPERS.—"Description of *Notoryctes typhlops*," by E. L. STIRLING, M.D., F.R.C.S. Eng. "Foraminifera of the Older Tertiaries, Part II. (Kent Town Bore)," by W. HOWCHIN, F.G.S

ORDINARY MEETING, APRIL 7, 1891.

Prof. RALPH TATE (Vice-President) in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., showed specimens of *Postrychus Jesuitica* from Port Pirie district, where it was attacking species of Acacia. Also some rock specimens from the neighbourhood of Lyndoch. J. C. F. JOHNSON, M.P., forwarded specimens of beetles from Western Australia, some of which Mr. Tepper thought were new. A. ZIETZ, Assistant-Director of the S.A. Museum, showed specimens of mollusca inhabiting the open sea, *e.g.*, a species of *Pteropoda*, two species of *Heteropoda*, and one of *Nudibranchiata*. Also species of *Salpa*, *Pyrosoma*, *Porpita*, and *Diphysiopsis*. Of vermes, a species of *Sagitta*. Also a series of larval stages of the higher crustacea. And several species of fish, one being a species

of *Scopelus*, showing the lateral luminous organs. WALTER HOWCHIN, F.G.S., exhibited some Foraminifera that were rock-builders. One sample, *Orbitoides Mantelli*, was from the Eocene-beds of Victoria. O. B. LOWER forwarded a specimen of the leaf-butterfly from the Khasia Hills, India.

NOTIFICATIONS.—Prof. TATE referred to a recent visit to the glaciated surface at Hallett's Cove with Mr. Robert Jack, Government Geologist for Queensland, who, after examination of the surface, concluded that the ice had travelled northward. A. ZIETZ drew attention to the occurrence of *Perameles Gunnii* (the soft-furred bandicoot) in South Australia. The specimens were obtained by Mr. Scriven, near Border Town. The habitats previously given of the marsupial were Tasmania and Victoria, on the authority of Mr. Oldfield Thomas, of the British Museum. Mr. Zietz referred to an evident misprint in the Catalogue-description, which should read "tail only dark above its base for one inch."

PAPERS.—"Habits and Customs of the Aborigines about the R. Finke, Central Australia," by Rev. Louis Schulze. "Description of New Coleoptera," by Rev. Thomas Blackburn, B.A.

ORDINARY MEETING, MAY 5, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

MOTION.—It was moved and carried—"That in the opinion of the Society, it is highly expedient that the Director of the Botanic Gardens, Adelaide, should be a botanist of high standing and attainments." It was also decided that the Chief Secretary be interviewed on the subject.

EXHIBITS.—Prof. TATE, F.G.S., showed coloured photographs of glaciers. Also a collection of rare species of *Cypræa* from Eocene strata of South Australia and Victoria. A. ZIETZ, Assistant-Director of the S.A. Museum, exhibited a large collection of weapons, charms, &c., used by the aborigines of Finke River district. CHARLES CHEWINGS, F.R.G.S., showed rock-specimens and fossils from the southern flanks of the MacDonnell Ranges. The fossils were in an excellent state of preservation, and comprised, amongst others, an *Orthoceras*, a *Raphistoma*, one or more species of *Leptæna*, and the tail of a large trilobite (*Phacops*, sp. ?). The facies was that of an Upper Silurian fauna.

PAPER.—An abstract was read from Mr. Schulze's paper submitted at the last meeting.

ORDINARY MEETING, JUNE 2, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

VOTE OF THANKS.—J. G. O. Tepper, F.L.S., and W. L. Cleland, M.B. (Hon. Sec.), were thanked for having prepared the abstract of Mr. Schulze's paper read at last meeting.

EXHIBITS.—A. ZIETZ, Assistant-Director S.A. Museum, showed a number of boomerangs, curiously carved, which had been forwarded to the Museum from the Elder Exploring Party. O. W. LOWER forwarded two species of moth, namely *Sphinx roseomaculata* and *S. distincta.*

PAPERS.—"Geological Notes on the Upper Finke River Basin," by CHARLES CHEWINGS. "Descriptions of New Australian Lepidoptera," by E. MEYRICK, M.A.

ORDINARY MEETING, JULY 7, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

VOTE OF CONDOLENCE.—The PRESIDENT reported the death of D. B. Adamson since last meeting. It was unanimously resolved that a letter of condolence and sympathy be sent to the widow expressing the loss felt by the Society in his death.

EXHIBITS.—A. ZIETZ, Assistant-Director of the S.A. Museum, exhibited the birds collected by Dr. Stirling during his transcontinental trip with Lord Kintore through Central Australia. O. B. LOWER forwarded specimens of *Charaxis Berenice*, or parrot butterfly, from Accra, Gold Coast, Africa.

PAPER.—"Plants collected by Dr. Stirling in Central Australia," by Prof. TATE.

ORDINARY MEETING, AUGUST, 4 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

BALLOT.—A. F Calvert was elected a Fellow of the Society.

VACANCY IN THE COUNCIL.—W. B. Poole was elected to fill the vacancy in the Council caused by the death of D. B. Adamson.

EXHIBITS.—A. ZIETZ, Assistant-Director of the S.A. Museum, exhibited a collection of turtles and tortoises from the Northern Territory. W. HOWCHIN, F.G.S., referred to the recent find of a *Diprotodon* skull at Gawler, together with other bones. J. J. EAST, F.G.S., showed an obsidian bomb of large size.

PAPERS.—"On a Subterranean Water-supply to Broken Hill," by SAMUEL DIXON; "Analysis of Volcanic Ash from Tanna, New Hebrides," by Prof. RENNIE, D.Sc.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

BALLOT.—R. S. Rogers, M.D., was elected a Fellow of the Society.

AUDITOR.—D. J. Adcock was elected auditor of the current year's accounts.

EXHIBITS.—O. B. LOWER exhibited two foreign butterflies. J. G. O. TEPPER, F.L.S., showed an insect that had been caught in a crack of Miocene clay, which on becoming moist had expanded and thus imprisoned and pressed the insect. Prof. TATE drew attention to how such an object occurring in a fossilised condition might lead to an erroneous conclusion unless carefully observed. In such a case the object would be more or less perpendicular to the deposit instead of being horizontal to it.

VOTE OF CONDOLENCE.—It was decided to send a letter of condolence to the widow of the late L. S. Wilkinson, Government Geologist for New South Wales, on the loss she had sustained, and expressing the regret felt by the Society.

PAPERS.—"New Mollusca," by Professor TATE. "Second Supplement to S.A. Bivalves," by Prof. TATE. "Notes on *Emydura latisternum* occurring in South Australia," by A. ZIETZ. In addition to the previously-known occurrences of *Chelodina longicollis*, in the River Murray and its tributaries, and *Chelymys Macquaria*, in Lake Alexandrina, Mr. A. Zietz records *Emydura latisternum* from the Mount Gambier lakes and the River Torrens, the latter locality from a capture made about 20 years ago, the former more recently. Hitherto the species has been known as inhabiting Queensland only.

ANNUAL MEETING, OCTOBER 6, 1891.

Rev. THOMAS BLACKBURN, B.A., in the chair.

REPORTS.—The annual report and balance-sheet of the Society were read and adopted. The annual reports and balance-sheets of the Field Naturalist and Microscopical Sections were accepted.

ELECTION OF COUNCIL.—The Council for the ensuing year was elected as follows:—President, Rev. Thomas Blackburn, B.A.; Vice-Presidents, Prof. Tate, F.G.S., F.L.S., and Samuel Dixon; Hon. Treasurer, Walter Rutt, C.E.; Hon. Secretary, W. L. Cleland, M.B.; Members of Council, Prof. Rennie, D.Sc., E. C. Stirling, M.D., Walter Howchin, F.G.S., W. B. Poole, Maurice Holtze, F.L.S., and J. S. Lloyd.

VOTE OF THANKS.—It was moved and carried that a special vote of thanks be passed to the following Fellows for their services on

the Council during the past year, namely, Prof. Tate, as Editor; Walter Rutt, C.E., as Treasurer; and W. L. Cleland, M.B., as Secretary.

PRESIDENT'S ADDRESS.—The President (Rev. THOMAS BLACKBURN, B.A.) then read his presidential address. It was carried unanimously that the address be printed.

PAPERS.—"Coleoptera of Australia," by Rev. THOMAS BLACKBURN, B.A. "Critical Remarks on Described Species of Australian Tertiary Echinoidea," by Prof. TATE, F.G.S., &c., &c. "Further Notes on Habits and Anatomy of *Notoryctes typhlops*," by Dr. Stirling. "Description of a New Foraminifer," by Mons. Schlumberger.

ANNUAL REPORT.

The Council has the pleasure of reporting that the work of the Society has been carried on successfully during the past year; and congratulates the Fellows and Members upon again meeting in a room entirely devoted to the use of the Society and its Sections, and excellently adapted for that purpose. It may be mentioned that the room was first used by the Society for its annual meeting on August 29th, 1860.

An interesting feature of the exhibits has been the showing of the recent accessions to the Museum collected by Dr. Stirling during his trans-continental trip with His Excellency the Governor, Lord Kintore, full catalogues of which have now been completed by Mr. A. Zietz, the Assistant-Director of the Museum.

During the past year seven Fellows have been elected, and one Corresponding Member transferred to the list of Fellows.

The Council has again the melancholy duty of reporting the death of three of the Fellows of the Society, namely F. S. Crawford, Dr. R. Schomburgk, and D. B. Adamson.

Frazer S. Crawford, who was elected a Fellow in 1865, was known chiefly for his study of the various parasites affecting fruits and cereals, and for his attempts to obtain reliable prophylactics for the same. As his labours assumed, to a very large extent, a practical turn, and were not directed so much to the discovery of new scientific facts of an exact nature as to affording useful information to the cultivators, his contributions to the Transactions of the Society were but scanty, and afforded no index of his untiring industry in his particular line of scientific work. Hence, his reputation as a scientist was more appreciated by Agricultural and Horticultural Societies, and by co-workers in the same field in different parts of the world, with whom he was a valued correspondent, than by this particular Society. His contributions consisted of papers "On the Apricot Disease" and "Notes on Certain Pores on the Veins of some Diptera."

Richard Schomburgk, Ph.D., was elected a Fellow of the Society in 1865, and was for many years an active member. Since 1878, when he read a paper on "Vegetable Fragments found in the tombs and other monumental buildings of the Ancient Egyptians," he has not contributed anything to the published Transactions of the Society. This was probably due to the full occupation of his time by his official duties and his advancing

years. Here again, unfortunately, the Society did not reap that harvest of scientific work which it might reasonably have expected from the hands of so distinguished a scientist.

D. B. Adamson, elected a Fellow in 1867, was well known to all as being pre-eminently a mechanical genius, and many of the older Fellows will remember his exhibition of various mechanical novelties of his own workmanship. From 1878 he was a constant member of the Council of the Society, and by his punctual and unfailing attendance at the meetings he considerably assisted at the dispatch of the business of the Society. Even in the well-trodden paths of mechanics he succeeded in evoking certain new facts which were considered worthy of being recorded in the Transactions of the Society. His chief contributions were—"Improvements in Curré's Di-electric Machine" and "On Measuring the Power of Telescopic Eye-pieces." He also at different times exhibited photographs of the moon, and of the recent solar eclipse.

Six Fellows have resigned, namely, Hon. A. Campbell, H. P. Gill, S. Knevett, W. J. E. Middleton, C. Unbehaum, and G. Vickery.

Ten Fellows have had their names removed by the Council from the list of members for non-payment of arrears of subscriptions, namely, W. T. Angove, J. E. Brown, F. W. Davis, Thos. Gill, C. H. Harris, Prof. Lamb, E. Laughton, M. P. O'Leary, F. Wheeler, and C. L. Wragge.

The membership of the Society consists at the present time of 10 Hon. Fellows, 88 Fellows, 13 Corresponding Members, and 1 Associate.

The Council is able to report that, owing to the increased shelving accommodation, the books belonging to the Society are now arranged in an easily-accessible position. It would suggest, as a recommendation to the Council for the coming year, that it consider some plan for facilitating the access of the Fellows and Members to the books. As usual, many valuable monographs, and a continuance of the numerous scientific serial publications from all parts of the world, have been received.

In order to make the library of the Society still more comprehensive and complete, the Council has put itself in communication with a number of American and European scientific Societies, whose publications have been solicited in exchange for those of this Society. The names of the principal ones are as follows:—Department of Agriculture, Washington; American Assoc. Advancement of Science, Salem, Massachusetts; N. Y. Microscopical Society, New York; Society Natural Sciences, Buffalo, Indiana; The Entomological Club, Cambridge, Massachusetts; Society Natural History, Cincinatti; and the Zoological Society,

Philadelphia. The Italian Entomological Society, Florence; the National Museum Natural History, Genoa; the Italian Society Natural History, Milan; the Zoological Station, Naples; and the Natural Science Society, Pisa. The Anthropological Society, Vienna; also the Natural History Museum of the same place. The Royal Museum of Natural History, Brussels. The Asiatic Society of Japan. The Scientific Society, Mexico. The Imperial Society of Naturalists, Moscow; and the Geological Society of the Institute of Mines of St. Petersburg. Also the Minister of Public Instruction, Paris, has been written to; as well as the Entomological Society and Royal Academy, Brussels. From Liege, the Memoirs of the Royal Society of Sciences; and from Leyden, Notes from the Leyden Museum have been received. The list of Australian exchanges has also been further made up, making a total of over 40 new exchanges which your Council hopes in time the Society may receive.

Following its usual custom of acting as your steward, the Council has made grants of money to help in furthering certain local scientific works. The most noteworthy of these were those for collecting palæontological specimens at Curramulka, Y.P., and the MacDonnell Ranges.

The vacancy in the Council caused by the death of Mr. D. B. Adamson was filled by the election of Mr. W. B. Poole, a former member of the Council.

The Fellows will have noticed that Part I. of the current year's Transactions has already been published and issued; and that the artistic work displayed in the illustration of Dr. Stirling's description of *Notoryctes typhlops* is of a very high order, and reflects great credit on the lithographer (Mr. H. Barrett), the Society, and South Australia.

The statement of receipts and expenditure by the Hon. Treasurer (W. Rutt, C.E.) will show that the financial position of the Society continues sound, notwithstanding its heavy expenditure.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.	Cr.	£	s.	d.	£	s.	d.
October 1st, 1890.							By Cost of Transactions—						
To Balance				332	16	8	Printing and Binding (1½ years)...	153	14	6			
" Subscriptions—							Illustrating, &c.	47	2	6			
Royal Society	108	3	0				Publishing	15	4	7			
Field Naturalists' Section ...	18	0	0								216	1	7
Microscopical Section	7	10	0				" Wages—Caretaker and Occasional Assistance				4	7	0
				133	13	0	" Printing, Postage, Telegrams, and Stationery				12	18	11
" Government Grant				145	1	0	" Advertising				8	14	2
" Interest				10	19	8	" Library—Binding				15	19	0
							" Stamp Duty				0	2	6
							" Grant in aid of Geological Exploration at Curramulka				3	0	0
							" Field Naturalists' Section—Grant				20	0	0
							" Microscopical Section—Grant ...				7	10	0
							September 30th, 1891.						
							By Balance—						
							Bank of South Australia	78	14	8			
							Savings Bank	255	2	6			
											333	17	2
				£622	10	4					£622	10	4

Audited and found correct.

D. J. ADCOCK, Auditor.

October 5th, 1891.

WALTER RUTT, Treasurer.

September 30th, 1891.

PRESIDENTIAL ADDRESS

To the Royal Society of South Australia, October 6, 1891.

It may be within the recollection of Fellows that when the Royal Society, a year ago, proposed to confer the office of President upon me, I *disclaimed* any *fitness* for it, on the ground that my little knowledge of science is confined to a single item in the great field of research, and that an item which is of special interest to very few of my colleagues; so that during my year of office the chair would be unable to take that part which befits its dignity in the various discussions of scientific matters that would probably come before the Society. I felt this strongly at that time, and I have felt it more strongly still as the time has come on when it is the duty of the President to address his colleagues at the annual meeting. Unfortunately, there is but one branch of science on which I could address you without a certainty of being ridiculous, and that branch of science belonging to Natural History is one that (I regret to know) is the subject of special study with very few of our Fellows.

Under these circumstances—although I have, of course, not thought of addressing you on any subject outside that which alone I have attempted to investigate—I have yet endeavoured to find some point from which to look at my own speciality that may also be a desirable point from which to regard at least *other branches of Natural History*. And, with this in mind, it has seemed to me that it would perhaps be no uninteresting task, nor yet an unprofitable one, to speculate upon the ultimate aim—the *final result* of the science which is called by that name Natural History—and to endeavour to place before our minds the particular contribution towards that result which the present generation of workers is more particularly qualified to render.

Such an inquiry is certainly not *wanting in practical importance*, because it is very clear that investigators who are aiming at a given result, soberly and reasonably regarded as possible for them, are infinitely more likely to render valuable service in the field of science than those who turn their attention here, there, and everywhere, and search, not for a recognised desideratum, but for any discovery that may chance to present itself to their gaze.

In the absolute *infancy* of scientific work such "free lances" are more likely to stumble upon what is valuable than when, at a

later time, scientific work has so far passed the stage of infancy that some idea can be formed concerning what it is likely to develop into.

Now, if a successful attempt is to be made to express in words the ultimate issue of studies in Natural History, it is clear, I think, that the mind must be prepared to look upon much that at present seems to be a *goal* as merely an initiatory stage. The *conclusions* towards which scientific workers are now struggling will, when they are reached, become mere premises to other conclusions, which perhaps again may have to become premises before Natural History can be strictly entitled to the name "science."

We in this generation are taking some of the earlier steps towards *making* it a science. I should suggest as an expression of what at present seems likely to be the *ultimate aim* of naturalists—the statement that their aim is to find out the reasons of the facts of nature. That is a subject that we know scarcely anything about. We can hardly be said to have discovered the meaning of even one or two of the signs on the hieroglyphic scroll of life which may serve as a beginning—by means of which we might attempt the task of deciphering the rest. For example, it certainly cannot be affirmed that the purpose of all the organs of the body in all animals is satisfactorily ascertained. Such a matter as that must be quite elementary in the enquiry I have spoken of, and ignorance or doubt concerning it must absolutely bar the path to the elucidation of more complex problems.

The imagination can delight itself in a world of infinitely interesting speculation if it enter upon the consideration of what will be some of those more complex problems that our descendants will, sooner or later, no doubt be in a position to approach. Take, for example, the question, "What are the reasons of the geographical distribution of species?" When one ponders the marvels of that distribution—how some one characteristic, perhaps a slight (and what seems to us to-day a *curious*, *unaccountable*) one, appears, and is persistent, or at least frequent, through a long series of species in a particular locality—as, for example, the tendency (in the Australian *Coleoptera*) to the disappearance of one or both claws of the tarsi; or, again, when one notices how certain types (of which *Stigmodera* is an example in Australia—where there are nearly 300 known species) seem to run riot, both in respect of fecundity and development, while others (apparently no less truly indigenous to the country) remain much less plentiful, and much less prolific in development (of which many examples might be cited—for the sake of an instance I will mention the remarkable *Phytophagous* beetle which Professor Westwood some 40 years ago named *Diphyllocera*, and of which there has only since been found one near ally on the Continent);

or yet again, if one observe the strange effect of *climate* on *color*, how, in one genus (say *Stigmodera)* by far the most richly-colored (as well as largest) species are found in the cooler latitudes, while the genus seems to decline in every way, becoming rarer, and represented by smaller, less brilliant forms as one approaches the tropics, while in another group (say the *Lamiides)* the case is absolutely reversed; when one takes all these and many other such remarkable facts into account, it is impossible to doubt that there is a *reason* for their being facts written, it may be in *geological*, it may be in *chemical* characters, and its record stored deeply in the bowels of the earth, or floating in the atmosphere, or on the ocean, awaiting the day when science shall be strong enough and wise enough to seize and read that record.

I think it is not passing the limits of what we are justified in asserting, to say that for every variety of structure in every species there is a *reason* (at least *conceivably* discoverable). Such an assertion is not based upon any particular view of the *nature* of species. On the theory of their immutability it may be assumed that the Creator of the various forms of life endowed each form with characters suited to what its needs would be, and therefore resulting (even though only by *anticipation)* from its environment. On any theory of *development* or *natural selection*, each character would, of course, *necessarily* be the *direct resultant* of some feature or features in the environment by means of which its development had been provided for.

If this be accepted as an *axiom*, and it really appears to me that it ought to be so accepted, there opens out a field of operations bewildering in its vastness in which one branch of natural science may be foreseen to throw light upon another, in which the problems and perplexities and difficulties of one class of workers may be solved by another class who are investigating what seems to be a totally disconnected subject, and in which some wide-reaching truth may be brought to light by the observance of some character or phenomenon in some sphere of study that for one reason or other appears among the least likely to be productive of important conclusions.

Thus, it is probable that if the reasons were adequately known of *the prevalence of given generic characters in given localities*, they would throw a flood of light upon *geology ;* and *vice versa* if the geological history (in the widest sense of that expression) of a particular country were known in all its details with absolute accuracy, we should be able to specify without much difficulty the reason why the development of the fauna of that country tended in a given direction.

Indeed, it has always appeared to me one of the strongest of arguments for the truth of the theory of development (which

might almost as well be called the theory of adaptation) that that theory fits in so well with the geological and climatic changes that we know to have occurred in all parts of the world. An unchangeable fauna in the midst of perpetually changing environment would not seem *likely* on *a priori* grounds to have been the form in which the Creator of the universe would design His work. It would be safe to affirm, I believe, that there is no species on the globe which, on the theory of its having been created in its present form, and incapable of structural modification, could have survived the changes that have taken place on and around the earth's surface.

Here, then, we have what (if not the *ultimate* work of natural science) will at any rate be its work in a very advanced period of its career, the investigation of the *reasons* of the facts of nature.

Interesting—even fascinating—as is the contemplation of the problems we can imagine our successors in the field of science a century hence being in a position to investigate successfully, I have, nevertheless, not brought the matter before you this evening merely as a curious speculation, but rather with the purpose of asking your attention to the importance of that step towards the eventual achievement, which falls to the lot of the scientific workers of the present day.

I think it will hardly be doubted that the special task needing to be accomplished by this generation, and in the present state of knowledge, is that of collecting and recording *facts and data*. I imagine there is scarcely a *possibility* of any more advanced work being more than *guessed* at in the lifetime of any one now working at science. The moment one attempts the more complex problems, one feels instantly the need of that exhaustive collection of the data and records of the facts that we are at present engaged in procuring.

Suppose, for example, the question be propounded, "Why is such and such a genus (say *Stigmodera*) an especially Southern Australian form?" We can *imagine* the reason to be founded on some long past *geological* change; but an apparently essential condition of any certainty on the point would be a very accurate and exhaustive knowledge of the fossils of all Australia —so that either it could be determined whether the present distribution is a continuance of that of former periods, or at least it might be said "there is sound reason to believe that geology can *throw no light* on the distribution of that genus in former ages." Geologists are at present working towards the ability to supply such information.

And again, if any attempt be made to generalise from the facts of geographical distribution, as I have no doubt some of my colleagues have learned by experience, the result is little more

satisfactory than a quickening of one's realization of how little is known concerning it. There are whole *orders* of animals whose geographical range in Australia has scarcely even *begun* to be worked out. Even in the *Coleoptera*—one of the orders that has received most attention—there are comparatively speaking very few genera of which it would be safe to affirm that it had been definitely *proved by facts* to be principally connected with a southern or a northern latitude in Australia, and so forth.

There are vast tracts of the continent of whose fauna we know very little. And even of those parts which have been *more* carefully investigated, the investigation has been productive of little more than a skimming of the surface (at least, as far as regards *publication*). I am not making mere guesses when I say this, for it can be supported with facts. Let me state a few facts. In respect of the vast order *Hemiptera*, including all its near allies—*Homoptera*, &c.—there is not, and, as far as I can ascertain, there *has not been* a single Australian worker—at any rate, not one who has published any scientific work on the subject. The same thing may be said, I believe, of the *Orthoptera* and *Neuroptera*. *One* Australian is working at the *Diptera ; one* at the *Hymenoptera*.

I am not overlooking the fact that here and there an isolated note may have been published on some member of one or other of these groups ; I believe, indeed, that the late Mr. W. S. Macleay, of Sydney (standing almost alone as an Australian scientific entomologist of the last generation) did publish descriptions of a few members of the orders I have named—or some of them ; and possibly one or two others may have just touched the subject. But there is no one who is working at them, and publishing on them in Australia in any systematic fashion. And how little has been accomplished even in those orders which have received more attention than others is realised almost distressingly by those who are working at them, in the enormous proportion of undescribed species that accumulate in any collection—accumulate with rapidity and to an extent that almost leads one to become confused and despairing amid the unwieldy mass of material.

Here, again, let me cite specific proofs of what I say. In the family *Hydrophilidæ* (a family containing some of the largest species in the whole order *Coleoptera*), my own small collection contains more species than the total that had been described from all Australia up to the date when the last edition of the "Catalogue of Australian Coleoptera" was published (some six years ago). Among the *smaller Coleoptera* the case is still more remarkable ; in the family *Cissidæ* (which is numerously represented in Australia) four years ago no Australian species whatever had been described ; in the *Dermestidæ* 13 species had been

described up to last year from all Australia; my collection contains 22 species. In the *Lathridiidæ*, the number described up to a couple of years ago was four from all Australia; my collection contains 18; probably some of the larger collections (the Sydney or Macleay Museum, for example) contain 50 or more. Thus you see that even in one of the most admired orders of insects the mere work of describing the Australian species is still in its infancy.

It appears, therefore, that the contribution towards natural seience, which it falls to the lot of this generation to make, is an accurate statement of facts, which may serve as reliable data in the future.

And here I will point out that not only are we of the present day little, if at all, qualified to attempt higher work, but also that any hope of the accomplishment even eventually of higher work must depend very much on what is done in this generation to provide the required data for our successors. Every day that passes renders those data more difficult to obtain, and less reliable. And that because the work of the world in many of its operations is disturbing the order of Nature. Commerce, for example, is rendering many other races of animals besides those of man and many plants cosmopolitan.

Here, too, I call your attention to the fact that Australia is probably of all the continents that in which the most important and reliable observations can be made. It has often been referred to as a remarkable phenomenon that whereas in the Old World—where the country is cut up into well-protected enclosures, by mighty ranges of snow-clad mountains, and by rivers that man himself is almost at a loss to bridge—the vast majority of species are of very wide distribution, many extending their habitat even from the islands off the West of Europe to those off the East of Asia; here on this Australian continent of vast and waterless plains, where for hundreds of miles the traveller will meet with nothing that could be called the boundary of a natural district, where, if an observant man could be set down in succession at any intervals along a line of two thousand miles, from near the east coast in N. S. Wales, to near the west coast in the neighborhood of Perth, he could scarcely decide from the superficial features of the country whether he was not all the time within a mile or two of his starting point—where wide distribution of species would seem much more probable than in almost any other region of the world—the precise reverse is the case, and there seems to be no other continent where so *few* species have a wide distribution.

This exceptionally limited distribution of species, where the reverse might reasonably have been expected, has often been

referred to as very surprising. But, I would ask, is it not very probable that the reason why this distribution is so limited is simply that it is *natural*, or nearly so? In most other extensive regions on the earth's surface it has been the case for thousands of years that commerce has been transporting the productions of each place to far distant points, and it can scarcely be thought likely that many species—at least of plants and the lower animals—could fail to have been at some time in such period transported by accident along with articles of trade, and under circumstances suitable to the establishment of their race. It was not until this process had continued for thousands of years that science entered upon the work of systematically describing and naming the various forms of life.

But in Australia the confusing hand of commerce has been held back from tampering with Nature's order until a time when science was to some extent prepared to enter the field, and (as you will, no doubt, remember) the scientific results of Australian exploration from the time of Capt. Cook onwards have been chronicled in at least a sketchy manner.

The reliance that can be placed on the naturalness of the occurrence of any species in an Australian locality is, however, every day becoming less. If there is to be an exhaustive and accurate record handed down for future use in science of the indigenous distribution of species on any large area of the earth's surface—which looks likely enough to be an essential condition of success in solving the more complex problems of natural science that will come before our successors—it would scarcely be going too far to say that it must be made in Australia; and it is absolutely certain that if it is to be made at all it must be made at once. Not only are plants and animals from other continents being naturalised, but those of one locality in Australia are being planted (and are propagating) in other and distant places. As an example, I may mention that only quite recently I have learned, through the observations of the Victorian Colonial Entomologist, that there has of late begun to be met with in Victoria a *Buprestid*, which I find to be *Stigmodera Brucki*, Thoms., an extremely handsome species indigenous to Western Australia, and which there can hardly be a doubt has been introduced into Victoria in timber from Western Australia.

Every year such occurrences become more and more probable, and they will to an increasing extent disturb the natural distribution of species. It is easy to perceive how in future times, and when natural science is in a very advanced state, the absence of reliable information as to what part of Australia is the real home of numerous species which will then probably be distributed over the whole continent, may most seriously interfere with the solution of many most important problems.

Much, then, in the possibilities of the future in respect of natural science depends upon the thoroughness and accuracy of the work that is done by the scientific men of the present day. If it is not done by them, the opportunity so far as regards a considerable part of it will have been lost for ever. What we have to aim at is (*a*) to catalogue, with sufficient description of an accurate well-worked-out character, all the species found in Australia; and (*b*) to place on record, with exact precision—the result of personal observation, not mere hearsay—a statement of the locality which each species inhabits, and of its manner of life.

But here I shall ask you to notice that the energetic pursuit of this work has a most important bearing upon *economic* science. It is frequently the case (to take an example illustrative of this remark) that some animal (say an insect) exists side by side with some hostile influence—it may be another animal—which latter appears to be the sole instrument that prevents its multiplying to an extent that would render it most mischievous. An instance of this is afforded by many of the wood-boring *Coleoptera*, which are preyed upon by *Coleoptera* of the carnivorous groups. Now, if the potentially injurious species be by any means introduced into some locality at a distance from its native habitat without its enemy also being introduced, it is very likely that—nature in its new abode being not armed against it—it will become a scourge, and entail the loss of most valuable property. When this occurs there is an outcry at once raised for a *remedy*, and persons not skilled in Natural History usually look towards the idea of using some chemical substance to poison the depredator or to render that on which it preys distasteful to it. But the direction in which the intelligent scientist will look for a remedy will be very different. His first question will be, "Where is the real home of this species?" and he will feel little doubt that the remedy is to be found in something there which has enabled the article needing protection elsewhere to go on existing in that particular locality in spite of the ravages of its destroyer.

It would not be too much to say that there are hundreds of the most local species of insects which are capable, if transported to localities at a distance from their natural home, of becoming *most injurious to vegetation*; and that in almost every such instance the checking of their mischief could be accomplished only by the transportation in addition of something which in their home has been hostile to their development. The next ten or twenty years will probably see an enormous multiplication of insect pests, owing to the increasing facilities for species being accidentally carried out of their natural and controlling environment.

Thus you observe that what at first sight looks like *barren* scientific investigation—I refer to the work of simply cataloguing and describing species, and recording their habitat, without any direct reference to economic questions—is in reality of the utmost importance. If an insect pest appear (devastating the timber or the foliage of a district), and no one knows whence it comes, the clue to the method of checking its ravages is missing, and the state of affairs is certainly serious. But if the scientist be at once prepared to say, "This is such and such a species, which is indigenous in such and such a locality, where it is not known to be particularly harmful," it at once becomes tolerably *certain* that a little intelligent investigation in the place indicated will suggest the remedy.

Nor can I omit to remark here that the Governments of the Australian colonies would act wisely if they were to accord more substantial aid than they do to the study of Natural History simply as abstract science, for no one can tell the practical value that may eventually attach itself to the record of even the slightest observation. In two of the sister colonies a "colonial entomologist" has been appointed, whose special work is to investigate the means of checking the ravages of insect pests; and that is, of course, a desirable precaution to have taken. But I venture to say that a few persons possessing a fair knowledge of natural science scattered over each colony, and especially in newly-occupied country, and working there at Natural History as such—and without any direct reference to economic questions—I venture to say that a few such workers would be of almost incalculable value in rendering the work of a "colonial entomologist" capable of attaining its purpose. Civilization and agriculture are advancing year by year, and taking possession for man's use of new tracts of country containing—beyond the possibilities that make for wealth and maintenance—multitudes of natural phenomena and forms of life which are so nicely balanced in numbers and power that no one of them is able to become seriously injurious to the others, but many of which might become so elsewhere if man should have the misfortune by any accident to convey them to distant localities. Surely, then, it is of the utmost importance that simultaneously with the advent of commerce and traffic, science should be represented, and should make its census of the local forms and conditions of life; so that if at some future time some form of life, harmless in its natural abode, should make its appearance elsewhere, having there become a scourge to agriculture, or other forms of industry, it may be at once recognised and traced to its home, where its antidote is no doubt to be found.

It is perhaps difficult to make practicable suggestions as to the method in which a Government could actively aid in scientific

investigation of the general kind which in the issue will prove to be of even greater importance and more "economic" than what is commonly called "economic science." But I may perhaps draw your attention once more to the fact (mentioned in our annual report) of this Society having recently spent from its funds in paying the travelling expenses of an agent, whom it sent to report upon certain local matters of scientific interest at a distance from Adelaide, and I draw your attention to it in order to suggest the question whether the Government might not fairly be asked to facilitate such investigations by permitting the free use of its railways for a specified journey by a specified person, say, under the condition of a certificate from the Council of the Royal Society, that it was sought for the *bona fide* purpose of desirable scientific exploration, which the person in question was competent to make. It certainly seems a short-sighted policy for a scientific Society to be obliged to pay travelling expenses on Government railways out of its scanty funds in order to procure information that on public grounds it is most desirable should be obtained. There can be no doubt that a very great deal of our scientific work is rendered incomplete, and that facts we desire to discover and observations which ought to be made are lost, perhaps irrecoverably, because of the difficulty of procuring reliable information as to the fauna of the remotest parts of the colony, in which difficulty the cost of travelling is one of the most formidable items; and it is not within the means of this Society to provide funds for the purpose on any sufficiently large scale.

I trust you will pardon me for having detained you so long listening to an address on a subject that is more or less outside the special lines of work that most of the Fellows of our Society are pursuing; and I trust, too, that what I have said may prove to have the effect of suggesting to the minds of some of our Fellows who are not actively pursuing any scientific work, that it really is important for natural science to be investigated and pushed on with as speedily as possible; a suggestion which might well induce them to take up the study of some scientific matter that has been as yet neglected on this continent, and so assist the ultimate purpose of our Society even more satisfactorily than they can do by their merely passive interest and pecuniary support.

DONATIONS TO THE LIBRARY

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TRANSACTIONS, JOURNALS, AND REPORTS.

Presented by the respective Societies, Editors, and Governments.

Argentine States.

Buenos Ayres—Revista Argentina de Historia Naturel, tome I., entrega 1 to 3.

Austria and Germany.

Berlin—Verhandlungen der Gesellschaft für Erdkunde, band XVII., Nos. 8, 9, 10; band XVIII., Nos. 1 to 6.
——— Zeitschrift, ditto, band XXV., Nos. 4 to 6; band XXVI., Nos. 1 to 3.
——— Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin, Nos. 20 to 53 (1890).
——— Abhandlungen der Königlich Preussischen Meteorologischen Instituts, band I., Nos. 1 to 3.
——— Ditto, ditto, Observatorium bei Potsdam.
——— Ergebnisse der Meteorologischen Beobachtungen, heft I., II.
Gottingen—Nachrichten von der K. Gesellschaft der Wissenschaften u. der Georg-August Universität, Nos. 1 to 21, 1889.
Halle—Leopoldina, heft 25, 1879.
——— Nova Acta der K. Leop. Carol. Deutchen Akad. der Naturforscher, band L., Nos. 3 and 6; band LII., Nos. 2 and 5; band LIV., No. 1.
Munich—Sitzungsberichte der Mathematisch-Physikalischen Classe der K. B. Akad. der Wissenschaften zu Munich, heft III., 1888; heft I., II., 1889.
——— Festrede, ditto, 1888, 1889.
——— Abhandlungen, ditto, band XVII., part 1.
Vienna—Sitzungsberichte der Mathematisch-Naturwissenschaftlichen Classe K. Akad. der Wissenschaften, Nos. 13 to 17.
——— Verhandlungen der K. K. Geologischen Reichenstalt, Nos. 10 to 18, 1890; Nos. 1 to 7, 1891.

Vienna—K. Akad. der Wissenschaften in Wien, Nos. 19 to 27, 1890; Nos. 1 to 18, 1891.
——— Verhandlungen der K. K. Zoologisch-Botanischen Gesellschaft in Wien, band XXXIX., quart. 3, 4; band XL., quart. 1, 2.
——— K. K. Gradmessungs Bureau, Astronomische Arbeiten, Langenbestimmungen, band I., II.
Wurzburg—Sitzungsberichte der Physikalisch-Medicinischen Gesellschaft, Nos. 1 to 10, 1890.

BATAVIA.

Batavia—Naturkundig Tigdschrift voor Nederlandsch-Indië, Deel 50.

BELGIUM.

Brussels—Annales Société Royale Malacologique, tome XXIV., 1889.

BRAZIL.

Rio de Janeiro—Revista do Observatorio, anno V., Nos. 6 to 12; anno VI., Nos. 1 to 6.
——————— Ditto, Climatolog. do Brazil.
——————— Annuario Observatorio Astronomico do Rio de Janeiro, 1888, 1889, 1890.
——————— Annales de l'Observatoire Impériale, tome IV., parts 1, 2.

CANADA.

Montreal—Canadian Record of Science, vol. IV., Nos. 4, 5.
———— Geological and Natural History Survey of Canada; List Canadian Hepaticæ; Canadian Plants, part 5 (Acrogens); Contributions Canadian Palæontology, vol. I., part 3; vol. III.
Ottawa—Summary Report Geological Survey Department, 1890.
——— Royal Society of Canada; Documents Relating to Fixing Standard of Time.
Toronto—Proceedings Canadian Institute, vol. VIII. (third series), fasc. 2.

CHILI.

Santiago—Verhandlungen des Deutschen Wissenschaftlichen Vereins, band II., heft 2.

FRANCE.

Angers—Bulletin de la Société d' Etudes Scientifiques d' Angers, année XVI., 1886; XVII., 1887.
Caen—Bulletin de la Société Linnéenne de Normande, vol. II. (fourth series).

Paris—Lois, Statuts, et Règlements de l'Institut de France, 1889.
—— Feuilles des Jeunes Naturalistes, series III., Nos. 241 to 251.
—— Bulletin Entomologique, pp. 153 to 224, 1890; 1 to 128, 1891.

GREAT BRITAIN AND IRELAND.

Belfast—Report and Proceedings Belfast Natural History and Philosophical Society, session 1889-90.
Dublin—Transactions Royal Irish Academy, vol. XXIX., parts 1 to 16.
——— Proceedings ditto, vol. I. (third series), Nos. 1 to 5.
——— Cunningham Memoirs, ditto, Nos. 1 to 6.
——— Scientific Proceedings Royal Dublin Society, vol. VI., parts 7, 8, 9.
Edinburgh—Royal Physical Society, session 1889-90.
———— Royal Society of Edinburgh, vol. XVII., 1889-90.
London—Journal of the Royal Microscopical Society, parts 5, 6, 1890; parts 1 to 4, 1891.
——— Proceedings Royal Society, Nos. 281 to 293.
——— Catalogues British Museum; Marsupialia and Monotremata; Fossil Mammalia, parts 1 to 5; Birds, vols. XIII., XIV., XV., XVIII., XIX.
——— British Museum, Zoological Collection H.M.S. "Alert," 1884.
Manchester—Memoirs and Proceedings Manchester Literary and Philosophical Society, vol. III. (fourth series); vol. IV. (fourth series), Nos. 1 to 3.
———— Journal Manchester Geographical Society, vol. VI., parts 7 to 9.

INDIA.

Calcutta—Catalogue of Mammalia (Indian Museum), part 2.
——— Indian Museum Notes, vol. I., No. 5.

ITALY.

Turin—Bolletino dei Musie di Zoologia ed Anatomia Comparata dello R. Università di Torino, vol. V., Nos. 74 to 93; vol. VI., Nos. 94 to 103.

JAPAN.

Tokio—Journal College of Science, Imperial University, vol. III., part 4; vol. IV., part 1.
—— Transactions Seismological Society, vol. XV.

MEXICO.

Mexico—Memoirs de la Sociedad Cientifica (Antonio Alzate), tomo III., Nos. 11, 12; tomo IV., Nos. 3, 4.

NEW SOUTH WALES.

Sydney—Records of the Australian Museum, vol. I., Nos. 4 to 8.
——— Monographs Australian Museum; Catalogue 12, Nests and Eggs of Birds found Breeding in Australia and Tasmania (A. F. North, F.L.S.); Catalogue Australian Birds, Australian Museum, part 3; Supplement Museum Report, 1889; Hints on Preservation Specimens Natural History, fourth edition.
——— Technological Museum, Descriptive Catalogue, No. 1; Technical Education Series, Nos. 7, 7A; Wool Catalogues, Nos. 1, 2; Annual Report, 1890.
——— Bulletin Department of Agriculture, No. 1.
——— Agricultural Gazette, vol. I., part 3; vol. II., parts 1 to 7.
——— Department of Mines—Records Geological Survey, vol. II., part 2, 1890, part 3, 1891; Memoirs ditto, Palæontology, No. 5; Cœlenterata, part 1 (R. Etheridge, jun.); ditto, No. 7, Mesozoic and Tertiary Insects.
——— Department of Public Instruction—Wattles and Wattle Bark (J. H. Maiden, F.L.S.); Hints Collecting and Preserving Raw Products, ditto.
——— Proceedings Linnean Society, vol. V., parts 3 and 4; vol. VI., part 1.
——— Proceedings Royal Society N.S.W., vol. XXIV., parts 1, 2.
——— Sydney University, Calendar, 1891.

NEW ZEALAND.

Auckland—Report Auckland Institute and Museum, 1890-91.
Dunedin—New Zealand Journal of Science, vol. I. (new issue), Nos. 1 to 4.
Wellington—Colonial Museum and Laboratory, Annual Report (twenty-fifth).
———— Transactions and Proceedings New Zealand Institute, vol. XXIII., 1890.

NORWAY AND SWEDEN.

Bergen—Bergens Museum Aarberetning, 1889.
Christiana—Den Norske Nordhavs Expedition (1876-78), XX., Pycnogonidea
———— Jahrbuch des Norwegischen Meteorologischen Instituts, 1888, 1889.
Stockholm—Geologisha Föreningens, band XII., heft 3 to 7 · band XIII., heft 1 to 4.

Brisbane—Bulletin Department of Agriculture, Nos. 4, 7, 9.
——— Annual Report Queensland Museum, 1890-1891.
——— Annals ditto, No. 1.
Townsville—Reports Geological Survey Office—Tin Mines near Cooktown (second); Geology Cooktown District; Cape River Gold Field; Coolgarra Tin Mines and District; Paradise Gold Field; Geology, &c., Upper Burdekin; Broken Hill; Gympie Gold Field.

RUSSIA.

Kasan—Bulletin de la Société Physico-Mathématique, tome I., No. 1.

SOUTH AUSTRALIA.

Adelaide—Report Board of Governors Public Library, Museum, and Art Gallery, 1889-90.
——— Meteorological Observations Adelaide Observatory, 1883, 1888 (Charles Todd, M.A., C.M.G., F.R.S.).
——— Proceedings Agricultural and Horticultural Society, 1890-91.
——— Annual Report Adelaide School of Mines and Industries, 1890.

STRAITS SETTLEMENT.

Perak—Government Gazette.

SWITZERLAND.

Geneva—Compte Rendu des Séances de la Société de Physique et d'Histoire Naturelle, No. VIII., 1890.
Lausanne—Bulletin de la Société Vaudoise des Sciences Naturelles, vols. XXV., XXVI., XXVII.

TASMANIA.

Hobart—Parliamentary Papers.

UNITED STATES, AMERICA.

Baltimore—John Hopkins University Studies (eighth series), 1 to 4.
——— Register ditto, 1889-90.
——— Circulars ditto, vol. X., Nos. 83 to 91.
——— American Chemical Journal, vol. XI., No. 8; vol. XII., Nos. 1 to 5; General Index, vols. I. to X.
Boston—Proceedings American Academy Arts and Sciences, vol. XVI. (new series), 1888-89.

Boston—Proceedings Boston Society Natural History, vol. XXIV., parts 3 and 4, 1889-90.
——— Memoirs ditto, vol. IV., Nos. 7, 8, 9, 1889-90.
Cambridge—Bulletin Museum Comparative Zoology, Harvard College, vol. XX., Nos. 2 to 8; vol. XXI., Nos. 1 to 4. Annual Report, 1889-90.
Chapel Hill, North Carolina—Journal Elisha Mitchell Scientific Society, vol. VI., part 2, 1890.
Cincinnati, Ohio—Journal Comparative Neurology, vol. I.
Granville, Ohio—Bulletin Scientific Laboratories, Denison University, vol. V.
Minneapolis—Bulletin of the Minesota Academy of Natural Sciences, 1883-86.
New York—Transactions of the New York Academy of Sciences, vol. IX., Nos. 1 and 2.
——— Annals ditto, vol. V., Nos. 1, 2, and 3.
Philadelphia—Proceedings of the Academy of Natural Sciences, part 3, 1889; part 1, 1890.
——— Wagner Free Institute of Science, vol. III., 1890.
San Francisco—Proceedings of Californian Academy of Sciences, vol. II. (second series), 1889.
Washington—Memoirs of the National Academy of Sciences, vol. IV., part 2.
——— Smithsonian Institution, Annual Report, part 2, 1886; parts 1 and 2, 1887. Proceedings U.S. National Museum, vol. XII., 1889. Bulletin ditto, No. 38, 1890.
——— United States Geological Survey—Bulletin, Nos. 54 to 57; Monographs, XV., parts 1 and 2, XVI.; Annual Report, 1886-87, parts 1 and 2.
——— United States Department of Agriculture—North American Fauna, Nos. 3, 4.

VICTORIA.

Ballarat—Annual Report School of Mines, 1890.
Geelong—Annual Report Gordon Technical College, 1890.
Melbourne—Victorian Naturalist, vol. VII., Nos. 6 to 12; vol. VIII., Nos. 1 to 5.
——— Transactions Royal Geographical Society of Australasia (Victorian Branch), vol. VIII., part 2; vol. IX., part 1.
——— Proceedings Royal Society of Victoria, vol. III. (new series); Transactions ditto, vol. II.; vol. III., part 1.
——— Australian Association for the Advancement of Science, vol. II.

MONOGRAPHS AND BOOKS.

Presented by the respective Societies, Museums, and Governments.

Backhouse, T. W.—Structure of the Sidereal Universe.

Brazier, John, F.L.S.—Notes and Critical Remarks on a Donation of Shells to the Conchological Society of Great Britain and Ireland.

——————— Mollusca Trawled off Mirembula, N.S.W.

Brown, H. Y. L., Government Geologist, S.A.—Report of Country, Alice Springs.

French, C., F.L.S.—Handbook Destructive Insects, Victoria.

Hayter, H. H., C.M.G., Government Statist, Victoria—Victorian Year Book, vols. I., II., 1889-90.

——————— Census, Victoria, Approximate Return, 1891.

Helland, Amund—Lakis Kratere og Lavastromme.

Kirk, T. W., F.L.S.—Icerya Purchasi, and its Cure.

——————— Notes on the Breeding Habits of the European Sparrow *(Passer domesticus)* in New Zealand.

——————— Phylloxera and other Diseases of the Vine.

Leibius, A., Ph.D., M.A.—Presidential Address Royal Society, N.S.W.

Marçou, Jules—Lower and Middle Taconic of Europe and North America (Cambridge, U.S.A.).

——————— Pamphlets (2).

Mueller, Baron F. von—Iconography Australian Salsolaceous Plants, decades I. to VII.

North, A. J.—Supplementary Catalogue Nests and Eggs, Australian and Tasmanian.

Perrin, Geo. S., F.L.S.—Report State Forests, Victoria, 1890.

Rand, Rev. Silas T., D.D., LL.D.—Dictionary Language Micmac Indians, Halifax, Nova Scotia.

Stirling, Jas., F.G.S., F.L.S.—Notes on the Hydrology of the Mitta Mitta, Melbourne.

LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1891.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election.

HONORARY FELLOWS.

1857. BARKELY, SIR HENRY, K.C.M.G., K.C.B., F.R.S., Royal Colonial Institute, London.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer, Victoria, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Palæontologist to the Geological Survey of New South Wales, Sydney.
1853. GARRAN, A., LL.D., Sydney, New South Wales.
1855. HULL, H. M., Hobart, Tasmania.
1878. JERVOIS, SIR W. F. D., K.C.M.G., C.B., F.R.S., Ex-Governor of South Australia, London, England.
1855. LITTLE, E.
1878. MACLEAY, SIR WILLIAM JOHN, F.L.S., Ex-President Linn. Soc. N.S.W., Sydney, New South Wales.
1879. *MUELLER, BARON F. VON, K.C.M.G., F.R.S., M. and Ph.D., F.G.S., F.R.G.S., F.C.S., C.M.Z.S., &c., &c., Government Botanist, Melbourne, Victoria.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer N.S.W., Sydney, New South Wales.

CORRESPONDING MEMBERS.

1881. BAILEY, F.M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1880. CANHAM, J., Stuart's Creek, Beltana, South Australia.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Glenferrie, Melbourne, Victoria.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1881. GOLDSTEIN, J. R. Y., Melbourne, Victoria.
1878. *HAYTER, H. H., M.A., C.M.G., F.S.S., Government Statist, Melbourne, Victoria.
1880. *KEMPE, REV. J., Hermannsburg, Charlotte Waters, South Australia.

1886. NICOLAY, REV. C. G., Fremantle, Western Australia.
1880. *RICHARDS, MRS. A., Beltana, South Australia.
1883. *STIRLING, JAMES, F.L.S., Assistant Geological Surveyor, Elsternwick, Victoria.

FELLOWS.

1887. ADCOCK, D. J., Adelaide, S A.
1874. ANGAS, HON. J. H., M.L.C., Adelaide, S.A.
1891. ASHBY, EDWIN, North Adelaide, S.A.
1887. BAGOT, JOHN, Adelaide, S.A.
1887. *BLACKBURN, REV. THOMAS, B.A., Woodville, South Australia.
1890. BOARD, GREGORY, Metallurgist Port Pirie Smelting Works, Port Pirie, S.A.
1884. BOETTGER, OTTO, Adelaide, S.A.
1886. BRAGG, W. H., M.A., Professor of Mathematics University of Adelaide, S.A.
1882. BROWN, L. G., Adelaide, S.A.
1883. *BROWN, H. Y. L., F.G.S., Government Geologist South Australia, Adelaide.
1884. BUSSELL, J. W., F.R.M.S., North Adelaide, S.A.
1891. CALVERT, A. F., Adelaide, S.A.
1888. CHAPMAN, R. W., M.A., B.C.E., Lecturer on Mathematics and Physics University of Adelaide, S.A.
1879. *CLELAND, W. L., M.B., Ch.M., F.R.M.S., J.P., Assistant Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, S.A.
1876. (L) COOKE, E., Commissioner of Audit South Australia, Adelaide.
1880. COX, W. C., Semaphore, S.A.
1887. *DIXON, SAMUEL, Adelaide, S.A.
1876. DOBBIE, A. W., Adelaide, S.A.
1890. *EAST, J. J., F.G.S., Registrar School of Mines, Adelaide, S.A. (Corresponding Member, 1884).
1871. ELDER, SIR THOMAS, K.C.M.G., Adelaide, S.A.
1887. EYRES, THOMAS, Adelaide, S.A.
1886. FLEMING, DAVID, Adelaide, S.A.
1890. FLETCHER, ALFRED W., B.Sc., Kent Town, S.A.
1876. FLETCHER, REV. W. ROBY, M.A., Kent Town, S.A.
1883. FOOTE, HENRY, Burnside, S.A.
1882. FOWLER, WILLIAM, Kulpara, S.A.
1889. FRASER, J. C., Adelaide, S.A.
1882. GARDNER, WILLIAM, M.D., Ch.M., Lecturer on the Principles and Practice of Surgery and on Clinical Surgery University of Adelaide, Hon. Surgeon to the Adelaide Hospital, S.A.
1891. GILL, WALTER, F.L.S., Conservator of Forests South Australia, Adelaide
1880. *GOYDER, GEORGE, JUN., Government Analyst South Australia, Adelaide.
1890. GRAY, REV. WILLIAM, Tanna, New Hebrides.
1887. GRASBY, W. C., Editor *Garden and Field*, Adelaide, S.A.
1876. HARROLD, A. L., Adelaide, S.A.
1861. HAY, ALEXANDER, Adelaide, S.A.
1882. HENRY, ALEXANDER, M.D., Adelaide, S.A.
1891. HOLTZE, MAURICE, F.L.S., Director Botanic Gardens, Adelaide (Corresponding Member, 1882), Adelaide, S.A.
1883. *HOWCHIN, WALTER, F.G.S., Goodwood, S.A.

1883. HUGHES, H. WHITE, Booyoolie, S.A.
1891. JOHNSON, J., M.D., F.R.C.S., Medical Officer Mount Gambier Hospital, Assistant Colonial Surgeon, Mount Gambier, S.A.
1853. (F) KAY, ROBERT, General Director and Secretary S.A. Public Library, Museum, &c., Adelaide, S.A.
1884. LENDON, A. A., M.D., M.R.C.S., Lecturer on Forensic Medicine and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital and Children's Hospital, North Adelaide, Adelaide, S.A.
1856. LLOYD, J. S., Adelaide, S.A.
1889. LOUGHHEAD, JAS. H., Adelaide, S.A.
1888. LOWER, O. B., Parkside, Unley, S.A.
1885. *LUCAS, R. B., Adelaide, S.A.
1873. MAGAREY, A. T., Adelaide, S.A.
1874. *MAGAREY, HON. S. J., M.D., M.L.C., Adelaide, S.A.
1853. MAYO, GEORGE, F.R.C.S., Adelaide, S.A.
1874. MAYO, G. G., C.E., Adelaide, S.A.
1882. *MEYRICK, E. T., B.A., Ramsbury, Hungerford, Wilts, England.
1880. MOLINEUX, A., Secretary Central Agricultural Bureau South Australia, Kent Town, S.A.
1859. (L) MURRAY, DAVID, Adelaide, S.A.
1884. MUNTON, H. S., Brighton, S.A.
1883. PHILLIPS, W. H., Adelaide, S.A.
1886. POOLE, W. B., Adelaide, S.A.
1882. ROBERTSON, R., F.F.P.S., Adelaide, S.A.
1885. *RENNIE, H. E., M.A., D.Sc., F.C.S., Professor of Chemistry University of Adelaide.
1885. RENNER, F. E., M.D., Petersburg, S.A.
1891. ROGERS, R. S., M.D., Adelaide, S.A.
1879. RUSSELL, WILLIAM, Port Adelaide, S.A.
1876. *RUTT, WALTER, C.E., Adelaide, S.A.
1866. SALOM, M., Adelaide, S.A.
1891. SAUNDERS, ERNEST C., Glenelg. S.A.
1891. SELWAY, W. H., JUN., Adelaide, S.A.
1886. SCOTT, JAMES L., Hyde Park, S.A.
1857. SMEATON, THOMAS D., Blakiston, Little Hampton, S.A.
1871. SMITH, ROBERT BARR, Adelaide, S.A.
1882. SMYTHE, J. T., B.A., B.E., Inspector of Schools South Australia, Glenelg, S.A.
1881. *STIRLING, EDWARD C., M.A., M.D., F.R.C.S., Lecturer on Physiology University of Adelaide, Hon. Director S.A. Museum, Hon. Surgeon Adelaide Hospital, Adelaide, S.A.
1878. STUCKEY, J. J., M.A., Adelaide, S.A.
1876. *TATE, RALPH, F.L.S., F.G.S., Professor of Natural Science University of Adelaide.
1877. *THOMAS, J. D., M.D., F.R.C.S., Adelaide, S.A.
1886. *TEPPER, J. G. O., F.L.S., Entomologist S.A. Museum (Corresponding Member, 1878), Adelaide, S.A.
1856. *TODD, CHARLES, C.M.G., M.A., F.R.S., F.R.A.S. Government Astronomer, Postmaster-General, and Superintendent of Telegraphs South Australia, Adelaide, S.A.
1882. TYAS, J. W., Registrar University of Adelaide, S.A.
1889. VARDON, JOSEPH, J.P., Adelaide, S.A.
1878. *VERCO, JOSEPH C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1883. WAINWRIGHT, E. H., B.Sc., St. Peter's College, S.A.

1878. Ware, W. L., Adelaide, S.A.
1879. Way, Edward W., M.B., M.R.C.S., Lecturer on Obstetrics and Diseases Peculiar to Women and Children University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1859. Way, Samuel J., Chief Justice and Lieutenant-Governor South Australia, Adelaide, S.A.
1882. *Whittell, Horatio, M.D., M.R.C.S., F.R.M.S., President Central Board of Health and City Coroner Adelaide, Adelaide, S.A.
1886. Wilson, John, F.E.T.S., Goodwood, S.A.
1886. *Zietz, A., Assistant Director S.A. Museum, Adelaide, S.A.

ASSOCIATE.

1884. Hodgson, Mrs., North Adelaide, S.A.

APPENDICES.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT.

The Committee have pleasure in submitting their eighth Annual Report, being for the year ending 30th September, 1891.

Evening Meetings.—Nine evening meetings have been held during the year, at which ten papers have been read. The average attendance again shows an improvement on that of the previous year. The largest number present at an ordinary meeting was 40, whilst at the annual conversazione in October last, about 120 persons attended. With each year of the Section's growth the difficulty increases of obtaining papers without falling back on the same contributors, owing to the limited number of those able or willing to assist in this direction. We have been fortunate, however, in the year under review in obtaining papers on a great variety of subjects, some of which have been contributed by gentleman not members of the Section, whose lectures have proved unusually interesting and instructive, and whose help has been greatly appreciated. The following gentlemen have given either lectures or papers during the year, viz., Professor E. H. Rennie, D.Sc., Rev. T. Blackburn, B.A., Messrs. W. C. Grasby, D. B. Adamson, J. G. O. Tepper, F.L.S., S. Dixon, F. C. Earp, Ph.D., F.C.S., and J. G. McDougall (corresponding member). Your Committee were pleased to receive a paper from a corresponding member, and hope that others will in this way give the Section the benefit of their local observations, as much valuable information may be gained by this means. The subjects of the papers read during the year may be classified as follows:—Astronomy, 1; chemistry, 2; geology and mineralogy 1; botany, 1; zoology, 1; and general subjects (tourists' observations, &c.), 4. The exhibits have, as usual, formed an interesting feature at these meetings. For many of the specimens the Section is indebted to our corresponding members, from whom it is hoped that a still larger number of contributions will be re-

ceived during the coming year. The conversazione was generally regarded as the most successful gathering of this kind yet held in connection with the Section. The attendance was very large; the exhibits were of unusual excellence; and the whole arrangements gave the greatest satisfaction.

Excursions.—There have been six excursions during the year, at which the attendance has been fairly maintained. Whilst enjoyable as a means of recreation, these outings afford an opportunity of gaining much valuable information of a practical kind, and your Committee trust that these facilities will be more largely utilised by the members. Notwithstanding the difficulty that now exists of finding fresh localities suitable for these outdoor gatherings, almost all the places to which excursions have been held this year have been visited for the first time by the Section. The most successful excursion, from a botanical point of view, was that to Teatree Gully on September 1st, when a rich sandy scrub was met with, containing many plants not usually seen near Adelaide.

Protection of our Native Fauna and Flora.—A separate report from the Committee appointed for this purpose will explain what progress has been made during the past year in connection with this important department of the Section's work.

Publications.—During the year an exchange of publications has been arranged with the Australian Museum, Sydney, from which institution some valuable "Records," &c., have been received. The "Victorian Naturalist" (the journal of the Field Naturalists' Club of Victoria) continues to be regularly supplied to the Section.

Membership.—During the year 13 persons were elected as members of the Section, and 18 names have been removed on account of resignation and other causes. The number now on the roll is 103.

SAML. DIXON, Chairman.
W. H. SELWAY, Jun., Hon. Sec.

Adelaide, 21st September 1891.

THIRD ANNUAL PROGRESS REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE.

In presenting their Third Annual Progress Report, the Committee, although regretting that the advance made has been somewhat tardy, are yet glad to be able to point to certain facts which should give satisfaction.

National Parks.—Owing to the difficulty experienced in getting the Government to take action, the Town Clerk of Adelaide (Mr.

T. Worsnop), at the instance of the City Corporation, acting in concert with the Committee, prepared a Bill last year vesting the whole of Government Farm in trustees in perpetuity as a National Park. The measure was entrusted to the charge of the Hon. S. Tomkinson, but was not introduced owing to a technical objection raised by the President. The Committee have, however, at last succeeded in gaining from the Premier (Hon. T. Playford) a promise that a Bill with similar objects will be introduced by the Government during the present session. The board of trustees suggested by the Committee includes one representative each of the Royal Society, the University, and the Municipal Association, the Mayor of Adelaide, the Chairman of the Botanic Board, and the Conservator of Forests *ex-officio*, and a Government nominee —a total of seven members.

Forest Reserves.—Last session, on the motion of the Hon. F. Krichauff, the Upper House decided that all forfeited lands in the Hundred of Para Wirra east of the main road from Mount Crawford to Gumeracha should be declared a forest reserve. In answer to an enquiry made by the Committee this year, the Commissioner of Crown Lands (Hon. W. Copley) has stated that these lands are reserved for the protection of the indigenous fauna and flora. Last year the Council also instructed the Surveyor-General to prepare a report as to other suitable sites for forest reserves.

Game Laws.—At the next meeting of the Australasian Association for the Advancement of Science, an attempt will be made to secure concerted action in the different provinces with respect to the amendment of the Game Laws. As in previous years, placards notifying the provisions of the Game Act have been distributed throughout the province by direction of the Commissioner of Crown Lands. The Committee desire to thank Mr. Copley for the special attention which he has given to this matter, and to express their pleasure at noticing certain prosecutions under the Act. On the motion of Mr. Hancock, the Lower House has affirmed the desirableness of declaring a close season for the kangaroo, and the Government have promised to introduce a Bill dealing with the question. The Committee believe that there is a probability of the subject being discussed more reasonably now than it was two years ago.

In conclusion, the Committee can only again express the hope that all friends of the movement will aid them in gaining the desired end.

SAML. DIXON, Chairman.
A. F. ROBIN, Hon. Sec.

Adelaide, September 21, 1891.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

RECEIPTS AND EXPENDITURE FOR THE YEAR 1890-91.

DR. RECEIPTS.	£	s.	d.	CR. EXPENDITURE.	£	s.	d.
To Balance brought forward	5	1	10	By Printing (General)	3	19	0
" Grant from Royal Society	20	0	0	" Printing (Proceedings)	4	15	0
" Subscriptions	18	0	0	" Postages	5	13	0
				" Advertising	3	3	11
				" Attendance	1	4	0
				" Sundries	2	2	10
					20	17	9
				" Subscriptions, as per contra, handed over to Hon. Sec. Royal Society	18	0	0
				" Balance in Hand	4	4	1
	£43	1	10		£43	1	10

Audited and found correct,

J. H. C. LANGDON,
THOS. EVANS, } Auditors.

W. H. SELWAY, JUN., Hon. Sec.

Adelaide, 21st September, 1891.

MICROSCOPICAL SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT, 1890-91.

The Committee, in submitting the Sixth Annual Report, are glad to be able to state that though the number of members is less than at any previous period, there is no lack of interest on the part of those who are really workers with the microscope, and the Section may now be considered as having stood the test of time, and is likely to be still the rallying point for all those engaged in this branch of scientific investigation.

The attendance during part of the session was not as good as it should have been from several causes, but with the return of our Chairman from England greater interest was manifested, and the number of members present at the meetings was considerably increased.

We regret to have to report the death of one of our Vice-Chairmen, Mr. F. S. Crawford, which was a great loss, not only to the Section, but to the colony as a whole. We are pleased that one whose scientific acquirements in his own special department were known beyond the limits of South Australia, was identified so closely with the Section from its formation.

Our Chairman, Mr. Poole, during his visit to Europe, took great pains in acquiring all the information he possibly could on microscopical matters, and we are glad to find that he was everywhere received with great kindness by fellow-workers with the microscope, and we trust that the experience gained by him will be of great service to us.

During the year the following donations of books have been made to the Section :—

A Synonymic Catalogue of the recent Marine Bryozoa, by Miss Jelly ; presented by Dr. H. T. Whittell.
3 vols. American Journal of Microscopy, bound, for 1877-9.
1 vol. ditto ditto, unbound, for 1881.

The total number of bound volumes in the library is 98, making a valuable collection of works of reference.

We have purchased during the year a good 1½-in. objective for use with the microscope belonging to the Section, and hope shortly to be able to add some higher powers.

We regret that no excursions have been made during the past session, the dryness of the season giving little promise of much success in the way of obtaining pond-life. We hope, however, that we shall be able to commmence again these pleasant and helpful means of increasing our knowledge of the objects of the unseen world around us.

The present number of members is 25 ordinary and 4 honorary. One member only has been elected during the year.

The business and subjects discussed at the meetings were as follows :—

1890.

Oct. 13. "The Foraminifera of the Port River," by Mr. W Howchin, F.R.G.S.

Nov. 11. Exhibition of Lantern Slides of Microscopical Objects, with Optical Lantern, by the Secretary (J. W. Bussell).

1891.

Mar. 10. Gossip Meeting.

April14. Exhibition of various Objects of Interest.

May 12. Address by Chairman (Mr. W. B. Poole) on "Microscopical Matters of Interest."

June 9. Exhibition of Lantern Slides of Photo-micrographs, by Optical Lantern, by the Secretary (J. W. Bussell).

July 12. Demonstration on the Best Method of Illuminating by Central Light, by Chairman (Mr. W. B. Poole).

Aug. 11. Continuation of above.

The balance-sheet shows a balance in hand of £3 12s. 5d., after paying all accounts.

MICROSCOPICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

RECEIPTS AND EXPENDITURE FOR YEAR ENDING 30TH SEPTEMBER, 1891.

1890.	RECEIPTS.	£	s.	d.	PAYMENTS.	£	s.	d.
Sept. 30.	Balance in Hand	4	8	7	Magazines	0	13	0
	Subscriptions	7	10	0	Binding Magazines	1	10	0
		11	18	7	Printing Annual Report	1	5	0
	Royal Society	7	10	0	Post Cards and Printing same	1	8	0
					Postage	0	9	2
					Caretaker	1	6	0
					1¼-in. Objective	1	15	0
						8	6	2
					Royal Society Subscriptions	7	10	0
					Balance in Hand	3	12	5
		£19	8	7		£19	8	7

Audited and found correct,

C. C. PRESGRAVE, Auditor.

W. B. POOLE, Chairman.

J. W. BUSSELL, Hon. Secretary and Treasurer.

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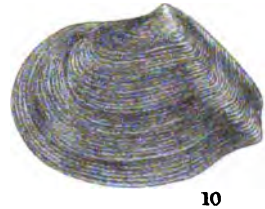

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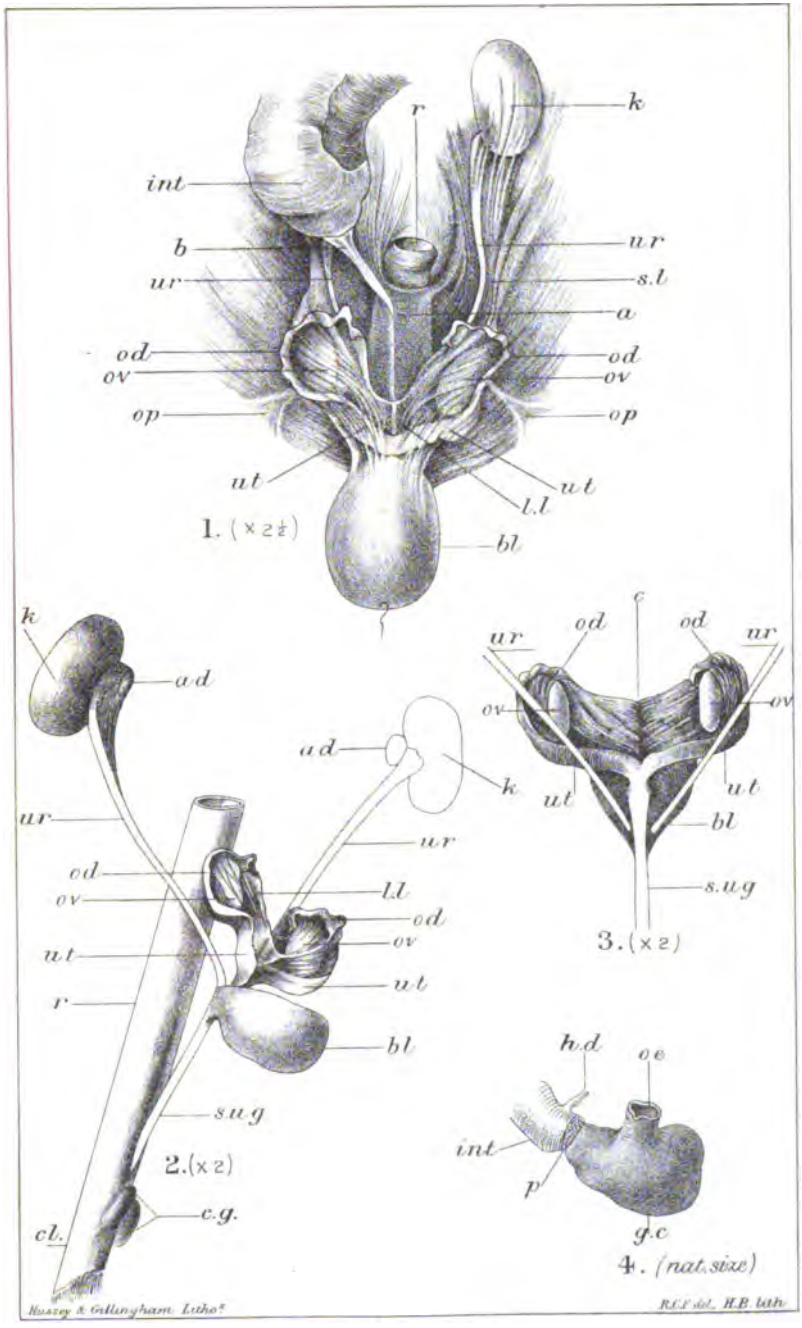
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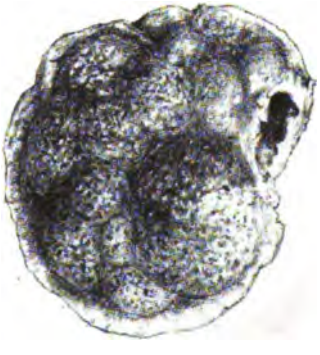
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